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The Effects of Online Collaborative Learning Activities on Student Perception of Level of Engagement

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The Effects of Online Collaborative Learning Activities on Student Perception of Level of Engagement

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Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

December, 2006

Dedication

I would like to dedicate this Dissertation to my husband, Milton, for his unending patience and support, and to my children, Savannah, Sierra, Skyler and Scout, for their presence is a continual reminder of the importance of discovering the possibilities through research in the field of education.

Acknowledgements

I would like to acknowledge the following people for their assistance with this work: my supervisor, Dr. Paul Resta, whose support and guidance was essential for the existence of this work, my committee members, Dr. Min Liu, Dr. Marilla Svinicki, Dr. Norvell Northcutt, and Dr. Jenny Burson, whose patience and continued support allowed the completion of this dissertation, the UT Telecampus who assisted me in the study, my parents, Carol and Peter Wolf, whose support was both motivating and reassuring, and finally, my husband Milton, who always believed in me.

The Effects of Online Collaborative Learning Activities on Student Perception of Level of Engagement

Publication No._____

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The University of Texas at Austin, 2006

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As online learning becomes more popular, higher education is becoming more interested in this new medium of learning. However, attrition has become a developing problem for colleges and universities that offer online classes, as some students found it was difficult to stay engaged in their online courses. From the literature, it was hypothesized that instructional designs that incorporate collaborative activities will lead to higher perceived engagement levels than those that incorporate individualistic learning. An exploratory study used a self-report survey instrument to measure students' perception of level of engagement in six graduate-level online classes (n=66). Half of the courses in the study integrated formal collaborative activities as a significant component of the course and half represented learning environments characterized by whole group and individualistic learning. The results showed a significant positive relationship between classes that used collaborative activities and engagement levels. However, the coded responses of the participants showed that while classes that use such activities had higher levels of

engagement, it is possible that this may be attributable to other factors external to the formal elements of collaboration in the course. Recommendations are offered for future research that may help identify the elements that contribute to engagement in online courses.

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Chapter 1: Introduction

BACKGROUND

There was once a time when perhaps it was unclear the role computers would take in the educational sector. However, as computers and computer technology have become increasingly more affordable, more powerful, and more functional, they also have become more ubiquitous to American life. Keeping in mind that America's place in the technological world is at stake, this trend in technology usage has, inevitably, extended to education as well (Molebash, 1999). The latest study conducted by the National Center for Education Statistics (2000-2001) show that 56% of the nation's 2-year and 4-year postsecondary education institutions offer distance education courses, 90% of which employ asynchronous Internet-based technologies. In a more recent survey, results show that "3.2 million students were taking at least one online course during the fall 2005 term, a substantial increase over the 2.3 million reported the previous year," which indicates continued growth in online education (Sloan-C, 2006).

There have been a number of studies that look at comparing traditional and online learning environments. Thomas Russell, director emeritus of instructional telecommunications at North Carolina State University, updates a web site titled "The 'No Significant Difference Phenomenon.'" This site offers selected entries from 355 research reports, all of which conclude that there is

little difference in the performance of students in traditional learning environments and those in online learning environments (Russell, 1999).

However, it is important to look at the media versus method debate sparked by Clark and Kozma in the 1980s that question the validity of such research comparing traditional and computer-based instruction. Clark (1983) stated that many such studies are inherently flawed since they do not, and cannot, control for instructional methodology. Clark saw a clear distinction between media and method, and concluded that media does not influence learning.

Kozma (1991), on the other hand, argued that media and method are not independent variables. Kozma pointed out that the capabilities of a medium can drive the instructional method, and thereby influence learning. Furthermore, Kozma pointed out that decisions about instructional design should shift from the plural to the individual, from a methodology applied to all students, to the individual application of a methodology applied to each student. Instructional design, according to Kozma, should take into consideration each student's past experiences, representations of symbol systems, and how each student processes these symbol systems (Nathan & Robinson, 2001). This debate starts the shift of research focus from the question of *should* technology be incorporated into classrooms to the perhaps more important question of *how*.

THE RELATIONSHIP BETWEEN ONE'S DEFINITION OF KNOWLEDGE AND THE POSSIBILITIES ONE SEES IN TECHNOLOGY

Yet, how technology relates to learning is directly related to the philosophical concept of knowledge itself. Another aspect of Clark and Kozma's debate is the epistemological assumptions both have brought to the table. In Clark's view, based on the theoretical foundations of such positivist researchers as Pavlov and Skinner, there is a definite, single reality, and knowledge is comprised of concepts that define that reality. Therefore, whether in a traditional environment or an online environment, learners must demonstrate the same understanding of these finite concepts (Moody, 2004). On the other hand, Kozma, influenced by constructivist theorists such as Piaget and Bruner, saw reality as a constructed entity, and the knowledge concepts that form this reality come from the particular group of participants. Therefore, the capabilities of technology that allow for increased negotiation, communication, and inquiry will further increase the opportunities for learning (Moody, 2004).

So, one might conclude that how an instructional designer chooses to use technological resources is directly related to the designer's epistemological stance. The expanse of the Internet, and all that it entails, further complicates the issue. From either direction, one might conclude that there are too many possible negotiations, or too many single entities from which to choose a single representation. Therefore, we are left with Wagschal's (1998) question, "What does it mean to 'know' in a world of information abundance?"(p. 129).

THE CHALLENGE FOR TEACHERS

College faculty as well as teachers must deal with learners for whom computing is simply another part of life. Most students today do not come into school without experiences of computers from home. Almost 75% of children in the United States between the ages of 12 and 17 and adults between the ages of 18 and 29 have Internet access (NUA, 2001). Students bring these experiences with them into the classroom, and such experiences become a foundation on which students build expectations of learning experiences (Sutherland, Facer, Furlong, R., & Furlong, J., 2000).

How does this student characteristic affect teachers? Many students now walk into the classroom already more knowledgeable about and also more comfortable with computer technology than many of their teachers. Therefore, many students have different needs and experiences of technology than their teachers (Sutherland, et. al., 2000; Collis, 1998). Their teachers are then faced with the problem of providing "the new generation of visually savvy on-line viewers…engaging on-line experiences" (Metros, 1999, p. 284).

Today, more and more collegiate instructors are encouraged to create, design and teach courses that are delivered exclusively on the Web. To do this, many colleges and universities use software such as Blackboard© and Web CT© to facilitate the creation of these stand-alone Web courses. Although it is common practice for instructors to try to "transfer" the content and teaching

techniques of a typical, lecture-based college course into a web format (Kirschner, Strijbos, Kreijns, & Beers, 2004; Reeves, Herrington, & Oliver, 2004), many have found that, once the novelty of being in an online class begins to wane, it is a particular challenge to keep online students *engaged* in such courses that employ such a traditional instructional design: “Rather than using technology as a means to facilitate and enhance creativity, educators more typically conform to technology utilization strategies that emphasize technologically mediated instruction as a substitute for ‘the real thing’”(Wagner, 1994, p.8).

ATTRITION IN ONLINE COURSES

As a teacher of Web-based collegiate English courses, I have found that many students become disillusioned with such instruction. The initial motivational factors quickly wane as the realities of self-directed instruction hit home.

Students of online instruction must be self-motivated and become engaged almost on their own. Students must be willing and motivated to get online and log onto the course, read a lot of text on the computer, and patiently wait for feedback. As a result, attrition is a major problem in many online courses (Carr, 2000). The *Chronicle for Higher Education* found attrition rates for distance learning “ranged from 20 to 50 percent, about 10 to 20 percent points

higher than those for classroom students" (Frankola, 2001, p. 14). One study found that attrition rates were higher for online courses, but so were enrollment rates (Terry, 2001).

E-learning providers have been trying to determine why so many students fail to complete online courses. "Some of the most common reasons e-learners give for dropping out of online courses are technology problems, lack of support, poorly designed courses, and inexperienced or even incompetent instructors" (Frankola, 2001, p. 14). Another study determined that "lack of time management skills and ill-defined educational goals were the primary reasons given by the students" who dropped out of online courses (Parker, 1995, p. 389).

However, another study found that in general, it was the "demands of life [that] prohibited successful completion of a course" (Lorenzetti, 2005). Given that online courses are often the only access some students have for a chance at higher education, it is not surprising that such an overloaded life would be difficult to balance. Life priorities aside and according to these studies, although students want to participate in online courses, it seems difficult for the students to stay *engaged* in the courses. Some schools, such as UCLA, Penn State and NYU, have experimented with different instructional designs, such as implementing courses that incorporate online collaboration, in an effort to increase student retention (Frankola, 2001).

EMERGENCE OF ONLINE COLLABORATIVE LEARNING

Online collaborative learning developed out of cooperative learning theories and practices. In many colleges, grades are given on the bell curve, forcing students to compete with each other. Other professors try to avoid such a competitive atmosphere by assigning grades based on a criterion-referenced basis, however students earn these grades by working individually (Johnson, Johnson & Smith, 1998). However, rather than learning through such competitive or individualistic efforts, some professors offer cooperative learning environments; through cooperative learning, "each student achieves his or her *learning* goal if and only if the other group members achieve theirs. Students work together in small groups to ensure that all group members achieve up to a preset criterion"(Johnson, Johnson & Smith, 1998, p.27). Cooperative learning has its roots in social interdependence, cognitive-developmental, and behavioral *learning* theories (Johnson, Johnson & Smith, 1998). It is through the positive interdependence of learning goals, scaffolding new perspectives of more capable members of the group, and incorporating incentives for members to participate in the group effort that forms the basis for cooperative learning theory (Johnson, Johnson & Smith, 1998).

However, collaborative learning is often differentiated from cooperative learning in that collaborative learning is often considered less structured than cooperative learning. Other learning theories further develop collaborative

learning, such as sociocultural theory (Vygotsky, 1978), constructivism, situated cognition (Lave & Wenger, 1991), problem-based learning (Cognition and Technology Group at Vanderbilt), distributed cognition (Salomon et al, 1992), and cognitive flexibility theory (Spiro et al, 1988). When students move from working cooperatively, whereby each group member works to finish a common task, to working together in constructing knowledge, the result is collaborative learning, the negotiation of meaning through the group efforts of accomplishing a task.

The collaborative aspect is very important. First, during the process of collaboration, students inquire for clarifications and explanations of each other (McConnell, 1994; Kearsley & Shneiderman, 1998). Students must defend their beliefs, and the structuring of such arguments is a form of meta-cognition. Secondly, collaboration increases the motivation to learn in several ways. Students who successfully work in teams feel responsible for the group (Deutsch,1949; McConnell, 1994). Furthermore, in many collaborative settings, students assess each other and each team project. This allows an opportunity for reflection, an important aspect of cognitive development, according to constructivists. Finally, a group setting allows for multiple perspectives to be considered. The exposure of different perspectives leads to a deeper understanding of the concepts being considered.

ENGAGEMENT AND COLLABORATION IN ONLINE LEARNING ENVIRONMENTS

Engagement is a concept that has been fluid in use yet weak in exact definition. Many researchers define engagement structured within their own perceptions of what is means to be engaged. Many do not discriminate between motivation and engagement. Kearsley and Shneiderman (1998) created Engagement Theory as a "conceptual framework for technology-based learning and teaching" (p. 20). Engagement Theory incorporates other fundamental theories. From Lave and Wenger's (1991) Situated Learning Theory, there is an emphasis on a community of learners and the collaboration between learners. Engagement Theory's emphasis on meaningful learning is consistent with Bruner's and Ausubel's constructivist learning theories. It is also similar to the theories of adult learning, such as Knowles' (1975, 1984) Androgogy, with its focus on experimental and self-directed learning. The basis of Engagement Theory is the creation of "successful collaborative teams that work "(p. 20).

However, it is also important to remember that not all engagement is cognitive engagement (Wong et al, 2000). While few agree upon the exact definition of engagement (more on this will be discussed in the literature review), most agree on the importance of engagement in cognitive learning (Marks, 2000; Herrington, Oliver, & Reeves, 2003; Finn & Rock, 1997). Furthermore, through the process of collaboration, students share experiences (Hall, 2002). These experiences help to build a community. Many students have reported higher levels of learner satisfaction learning within such a community (Jung et al, 2002). In a cyclic system, students participate in an active learning community, and

become more engaged, which leads to more active participation, and so on (Jones et al, 1994; Barker & Bills, 1999).

PURPOSE OF THE STUDY

However, there is little empirical research that looks at how collaborative learning relates to engagement in online courses. For such research to be conducted, a definition of engagement in online environments must be defined, and an instrument must be created that can discern levels of student engagement. In this way, engagement levels of students participating in online courses incorporating collaborative learning might be compared to those in learning environments focused on individualistic approaches to learning.

Therefore, the research question for this study is as follows:

Do collaborative activities within an instructional design affect the perceived engagement levels of students in online classes?

DEFINITION OF TERMS

Engagement - Based on a review of the literature (see the literature review), the following definition of engagement was created: Engagement describes the physical and mental state of a learner who is cognitively involved with a task. This state consists of three aspects: sustained time on task, persistence in spite of difficulties, and degree of flow.

Collaboration - Collaboration is the negotiation of meaning through the participation of students working together to complete a task. For the purposes

of this study, the collaborative learning condition is defined as one in which the instructor assigns small group, project-based collaborative learning tasks to students as a significant component of the course. The collaborative activities may take place synchronously using chat formats or asynchronously using discussion boards and emails, or a combination of such tools.

Individualistic Learning - For the purposes of this study, the individualistic learning condition is one which emphasizes individual assignments and learning tasks, and in which there is no formal requirement for the students to work together to complete a learning task.

Instructional Design - In this study, instructional design refers to the design elements of an online course, including the course goals, objectives, structure, and sequence of assigned learning tasks and activities, that are evident in the course syllabus and instructional materials.

Online Course - In this study, all courses represented stand-alone online courses in which there was little or no face-to-face contact between instructor and students. All communication and completion of course requirements are done online through the UT Telecampus college network.

HYPOTHESIS STATED

The actions involved with collaboration theoretically match those of engagement. As defined earlier, engagement as it is being used in this study describes the physical and mental state of a learner who is cognitively involved

with a task. This state consists of three aspects: sustained time on task, persistence in spite of difficulties, and degree of flow. Collaboration may entail more time on task. It takes longer to negotiate meanings than it does to rely on internal understandings. Furthermore, feeling responsibility for the group may lead to persistence in spite of difficulties. It may be more difficult to give up when group mates are depending upon every member participating. Finally, becoming involved with a group project can be challenging and interesting, and therefore, a likely opportunity for participants to become engaged to the point of flow. *Therefore, it is the hypothesis of this researcher that instructional designs that incorporate collaborative activities will lead to higher perceived engagement levels than those that incorporate individualistic learning.*

LIMITATIONS

The main limitation of this study is related to the population and sample used. Originally, the target population for the study consisted of undergraduate students in community college online courses. However, the institution that made commitments to allow the conduct of the study with its students subsequently decided not to support the study's implementation. Therefore, the study was reframed to focus on students in graduate level online courses as this continues to represent the largest proportion of online degree programs. The refocused study explored the relation of online collaborative learning to perceptions of level of engagement by graduate students in an online course.

Graduate students are in general older, more mature and more goal-oriented. While more likely for survey participation, their levels of engagement are less likely to vary in the same pattern as undergraduate students for the same reasons. Therefore, the results of this study may not be generalized to include undergraduate students.

Furthermore, while different aspects of validity were addressed (and discussed in the Methodology chapter) in the study, the nature of online distance learning makes it difficult to truly ascertain engagement levels through direct observation. These students were not in a lab, they worked at home and there was no way to measure exactly how much time they spent in attention to their classes. Most of these graduate students are taking the online program because they have full-time jobs that would make a traditional program unavailable to them.

In addition, the three classes that used collaborative learning activities also used project-based learning, while the classes that emphasized individualistic learning did not. Therefore, it is difficult to say how much of the engagement of the students was related to the collaboration aspect or the problem-based learning aspect. Furthermore, engagement levels could have been affected by the interaction of both problem-based learning and collaboration.

Another limitation of the study is the use of student perceptions as the measure of levels of engagement. There is no prior research indicating the

extent to which student perceptions of engagement correspond to observed levels of engagement, nor is there research on the stability of student perceptions of levels of engagement. It is assumed, however, that the student perceptions provide a general indicator of their sense of engagement throughout the course. This is not to say that such perceptions of engagement correspond to causes of engagement. There are many elements that may contribute to students' level of engagement such as prior knowledge, the student's personal motivation for learning, the quality of the course content, and the prior experiences of the student in the subject area. This study did not examine other factors that may have contributed to student engagement.

Furthermore, the treatments were not designed by the researcher. They are actual classes, with different teachers/designers. The sample size was dictated by the permission of the participating colleges and the professors. While a purposeful sample, the sample size is very small; 21% of the classes that did not use collaborative activities, and 33% of the classes that did use collaborative activities. Nor was the sample random. The participants of six online classes were enlisted to take the survey, but ultimately the participants of the survey were self-selected.

The instrument used for the study was a self-report survey. This survey was designed and tested by the researcher. However, it is not an established instrument. Therefore, internal validity is threatened by history, instrumentation and selection.

Chapter 2: Review of Literature

This section will look at the foundations of instructional design, the emergence of collaboration in online environments, engagement in online environments, and how collaboration relates to engagement.

THE FOUNDATIONS OF INSTRUCTIONAL DESIGN

Instructional design was first based in operant conditioning. "This principle of a priori specification of the terminal behavior in observable, measurable terms has been applied to classroom instruction in the form of instructional objectives, and often more specifically in the form of behavioral objectives" (Ormrod, 1999, p. 68). Behavioral objectives have three components: an observable and measurable outcome, stated conditions of such behavior, and a criterion of assessment (Ormrod, 1999). However, how such objectives are organized is often based on Gagne's hierarchy of learning tasks (Winn, 2002). The hierarchy is organized according to complexity (as cited in Patsula, 1999):

1. stimulus recognition
2. response generation
3. procedure following
4. use of terminology
5. discriminations
6. concept formation
7. rule application

8. problem solving

Gagné, Briggs and Wager (1988) argued that each learning task necessitated different instructional strategies, which differed in content organization and presentation (Winn, 2002). "Task analysis…became the preeminent tool for determining content organization. The products of task analysis…led directly to the specification of instructional objectives, thus prescribing the backbone of instruction" (Winn, 2002, p.332). Once content is organized, the type of learning identified, and objectives written, Gagné's "events of instruction" directed which instructional strategies to use (Gagné, Briggs & Wager, 1988). These nine instructional events are as follows:

1. Gaining attention
2. informing learners of the objective
3. stimulating recall of prior learning
4. presenting the stimulus
5. providing learning guidance
6. eliciting performance
7. providing feedback
8. assessing performance
9. enhancing retention and transfer

However, such learning events are dependent on the learning objectives. Bloom's "Taxonomy of Educational Objectives for the Cognitive Domain" lists six

general levels of knowledge in order of increasing complexity (Bloom, 1956 as cited in Ormrod, 1999). The taxonomy is as follows:

6. evaluation
5. synthesis
4. analysis
3. application
2. comprehension
1. knowledge

Behavioral objectives have often been criticized for focusing on lower-level skills rather than higher-level skills; however such objectives may be more typical simply because they are easier to compose (Ormrod, 1999). Bloom's taxonomy is a useful guide to coordinate objectives that incorporate both higher-level skills and lower-level skills (Ormrod, 1999).

Bruner's (1966) Constructivist Theory looks at "spiraling" information, so that the student may constantly build upon what was learned before. By applying this structure to learning experiences, students may be able to go beyond what information is given (Bruner, 1966). One way to structure information is by using Bloom's taxonomy, building upon lower-level skills.

However, there is another direction in which to arrive at learning. Bandura's Social Learning Theory explains the importance of observing others and modeling their behaviors (Bandura,1977). Vygotsky (1978) took this theory a step further with his theory of Social Cognitive Development. This theory also

stresses the importance of social assistance, in that it is through such interaction that allows learning to develop from a point of needing assistance to full independence, a span of time Vygotsky called 'the zone of proximal development' (Patsula, 1999). Piaget is also considered a part of the Constructivist movement with his theories of cognitive structures. According to Piaget, learning occurs in a social context through a process of assimilation and accommodation. One assimilates when one encounters information that agrees with one's existing cognitive structure, and one accommodates when one changes the cognitive structure to make sense of information one encounters that does not agree with one's existing cognitive structure (Bybee & Sund, 1982).

However, the term Constructivism as it is often used seems to combine these theories. It refers to the act of the social construction of meaning; that there is "no one true representation of knowledge," but that "people who are influenced by society and culture create knowledge" (Gabbard, 2000, p. 103). If it is understood that learning occurs through social interaction, as was theorized by Bruner, Bandura and Vygotsky, then how groups of people build that knowledge with the help of technology should be closely examined:

> Once educational technologists acknowledge the social nature of learning and understand the ways in which technology can support interaction among students, teachers, and experts, technologists can go to the additional step and ask whether cognition, generally,

> is distributed over entire communities linked by technology. (Winn, 2002, p. 341)

Distributed cognition is the idea that every person has her or her strengths, and that each person brings those strengths to the group. Through distributed cognition, a group might be able to do more than each of the individuals can do on his or her own (Winn, 2002). Therefore, through social interaction, groups of people bring their varied backgrounds and levels of expertise, and alternatively model and learn, and thereby construct knowledge.

However, if knowledge is constructed, how is it possible for behavioral objectives to be written within instructional design? There is a "fundamental difference in approaches taken by those who believe that instruction can be designed to teach knowledge and those who believe that knowledge is constructed by learners,"(Wilson, 1999, p.2) and many believe it is not possible to have a constructivist theory of instructional design (Wilson, 1999).

However, Wilson (1999) pointed out that it is important to remember Constructivism is "more a philosophy, not a strategy" (p.3). It is a way of seeing the world that includes the nature of reality (each of us constructs our own reality rather than there being one "true" reality out there), the nature of knowledge (it is constructed within rather than a single understanding out there to be taken in), the nature of human interaction (people negotiate meanings during the construction of knowledge and reality), and the nature of science (it is not absolute, but created through the process of construction) (Wilson, 1999). It is a

philosophical stance, not a prescriptive of design;"When we see the world in constructivist terms, we go about our jobs in a different way, but the difference cannot be reduced to a discrete set of rules or techniques" (Wilson, 1999, p.3).

However, Wilson (1999) also pointed out that the very nature of instructional design is prescriptive in that it "provides recipes or heuristics for doing designs and specifies how end-product instruction should look" (p.6). Therefore, as instructional designers, "we pay attention to stimulus design…because we have no choice. We prescribe general principles of message and interface design because those are aspects of the instructional design system that lie somewhat within our power to influence" (Wilson, 1999, p.9). On the other hand, while some "ID theorists and practitioners give every indication that their method of slicing up the world is *the* method, and that the content resulting from their analysis is *the* content to be taught to students "(p.9), it is possible to create designs that are "less analytical, more holistic, more reliant on the cooperation of teachers and materials and learners to generously fill in the gaps left gaping by the limitations of our analytical tools"(Wilson, 1999, p. 11). Wilson (1999) suggested the following as possible instructional strategies, while he says that he tries to put most learning outcomes within the framework of problem-solving:

Simulations,

Strategy and role-playing games,

Toolkits and phenomena,

Multimedia learning environments,

Intentional learning environments,

Storytelling structures,

Case studies,

Socratic dialogues,

Coaching and scaffolding,

Learning by design,

Group, cooperative, collaborative learning, and

Holistic psycho technologies.

Moshman (1982) also deliberated how constructivism can be practiced in the classroom, and identified three ways: endogenous, exogenous, and dialectical. Endogenous is the view that knowledge building is an individual act, and that the teacher should act as a facilitator within a learner-centered environment. Exogenous emphasizes the need for formal instruction that leads to active cognitive events. Such events form the knowledge representations that can be applied to real-life contexts. Finally, dialectical is the view that realistic experiences are necessary to construct such representations, but they require scaffolding from teachers and collaboration with peers.

THE EMERGENCE OF CSCL

In this study, online group collaborative learning is explored as an aspect of instructional design in online classes. Such a method is called computer-

supported collaborative learning, or CSCL: “in general, [CSCL] involves groups of students distributed across different locations working together on a common problem or project” (van Bruggen, Kirschner, & Jochems, 2002, p. 124). The concept of CSCL is “founded on the notion that computers can be used to facilitate, augment and even redefine interactions among members of a work group” (Koschman, 1994, p. 219). Traditionally, instructional technology research looked at the mind of the individual learner. However, research within the CSCL paradigm looks at the collective, or rather learning as it happens within the group (Stahl, 2005; Koschman,1996).

There are many applications for CSCL, depending on the locus of use, how such use is situated in time, and the intended instructional purpose (O’Malley & Koschman, 1993). CSCL applications have been utilized to connect users within a classroom, across classrooms as well as outside of classrooms, and such interaction can be synchronous or asynchronous (Koschman, 1994). Furthermore, the role of the CSCL can greatly vary as well. It can be used to mimic a group work environment in a real-world context (Bransford & The Cognition and Technology Group at Vanderbilt, 1992), and such group work can be compiled and stored to support “knowledge building” (Scardamalia & Bereiter, 1991) and “communities of learning” (Campione, Brown & Jay, 1992; Koshman, 1994). As more research into CSCL is done, one emergent theme is that technology can be used to support the collaborative learning process (Koshman, 1994, 1996).

To understand how CSCL grew out of the constructivist movement, it is important to look at the development of Computer-Assisted Learning, or CAL. Traditionally, CAL used segments of content that had end questions to determine if the user was ready to move onto the next segment (Dalgarno, 2001). These techniques often included drill and practice segments, and while some used Artificial Intelligence (AI) to determine a user's current cognitive state and build upon that, they usually were created on the basis that there was a single correct body of knowledge to be "learned" by the user (Dalgarno, 2001). Constructivist CAL materials incorporated hypertext and hypermedia, as well as simulations, to allow individuals to control and explore within a learning environment, a method that is consistent with Moshman's (1982) label of endogenous constructivism (Dalgarno, 2001).

Constructivist CAL materials that incorporate Moshman's (1982) exogenous constructivism are tutorials that allow for learner control and guided hypermedia. In this way, there is a structured learning sequence, but the learners may take control of the sequence or use the hypermedia to learn different aspects of the material, which allow for learner construction (Dalgarno, 2001). Other technological tools that can aid in exogenous constructivism "include text and hypertext editing tools, modeling tools and concept mapping tools" (Dalgarno, 2001, p. 189).

CSCL is a construct that follows Moshman's (1982) dialectical constructivism. It "emphasizes the role of social interaction in the learner's

knowledge construction process, leading to an emphasis on cooperative and collaborative learning strategies" (Dalgarno, 2001, p.190). Another important aspect of dialectical constructivism is scaffolding, and CSCL incorporates this concept as well. Technologies used to support CSCL can be categorized into three groups: tools that are used to generally support Computer Mediated Communication (CMC), tools that support Computer Supported Cooperative Work (CSCW) and tools that have abilities to specifically support group work (Dalgarno, 2001). Tools that support CMC include email, discussion boards and chat rooms, as these tools support both synchronous and asynchronous communication. Dede (1995) discussed how such CMC tools can be used to in coordination with virtual environments to allow for "collaborative learning within a virtual distributed world" (Dalgarno, 2001, p.190). Furthermore, "systems designed specifically for collaborative learning typically include a CMC component as well as tools for group learning tasks. These may include tools for group writing, tools to facilitate group discussions, tools for shared annotated hypermedia spaces or tools for shared problem solving" (Dalgarno, 2001, p. 191).

CSCL offers learners an opportunity for sustained student interest and a more natural learning environment (Kumar, 1996).

> "The promise of collaborative learning is to allow students to learn in relatively, cognitively motivating and socially enriched learning contexts….With CSCL, the student can discuss [learning] strategies with a

> group of fellow students who advise, motivate, criticize, compete, and direct the student towards better understanding of the subject matter." (Kumar, 1996)

Through its collaborative methodology and its flexibility of time and space, CSCL can become a tool of engagement within online distance learning classes.

COLLABORATION AS IT RELATES TO INTERACTIVITY

In terms of practicality, more research needs to look at how engagement works within the field of online distance education. However, in order to design such research, it is important to look at and thoroughly understand the essence of distance education. Distance education is "more than simply a geographic separation of learners and teachers. It is a distance of understandings and perceptions, caused in part by the geographic distance, that has to be overcome by teachers, learners, and educational organizations if effective, deliberate, planned learning is to occur"(Moore, 1991, p. 2). This distance, which Moore (1980, 1991) labeled as *transactional distance*, is relative and present in all classes, but poses a particular challenge in online courses. Moore argued that to breech that distance to the interaction of teaching and learning, dialogue between the teacher and the learner is the key between low and high transactional distance.

However, this is only one type of interactivity. Moore (1989) described three types of interactivity: learner-content, learner-instruction, and learner-

learner. Moore described learner-learner interaction as “a new dimension of distance education,” and “an extremely valuable resource for learning, and is sometimes even essential” (1989, p.4). There is some empirical evidence to support this theory. Kennedy (2001) did a study that looked at analyzing influences on student performance in online courses. She found that “although successful online students tended to prefer working independently, those who achieved the highest grades made the most effort to communicate with their teacher and with other students while taking the course” (Kennedy, 2001). These results seem to support the theory that learner-teacher and learner-learner interactivity is very important to a successful online learning experience.

How does an online course support such interactivity? This is not as easy as it may seem. As Sims (2003) explained, “the combination of educational psychology and interactivity research demonstrate that effective interaction is not only multi-dimensional…but also dependent on the ways in which learning activities and teaching strategies are implemented”(p.89). It would seem that successful interactivity is dependent on the instructional design of an online course. However, as interaction options increase through newly developed digital and networked technologies, so do new opportunities for educational innovation (Sims, 2003). Therefore, new “design techniques need to incorporate both technological and theoretical understandings” and such techniques will “require ongoing reflection and investigation” (Sims, 2003, p. 90).

This is not to say that one type of interactivity is more important than the others, and that all designs should be the same. Indeed, Moore (1989) pointed out that "the main weakness of many distance education programs is their commitment to only one type of medium" (p.5). Moore (1989) went on to explain that the instructional designs should reflect an understanding of how each type of interaction may be suitable for various teaching tasks. Therefore, while learner-learner interactivity is important and useful, it may not be appropriate for all teaching tasks.

COLLABORATION: DEFINITION, BENEFITS AND PROBLEMS

Collaboration is one type of learner-learner interactivity. In this study, collaboration is defined as a small group of students working together to complete a task. This definition has been used by other researchers, such as Jung, Choi, Lim and Leem (2002), who defined collaborative interaction as "a group of learners [who] work collaboratively on a specific topic or share ideas and materials to solve a given problem"(p. 153). However, within this one concept lies a world of possibilities: "The essence of collaboration is the construction of shared meanings for conversations, concepts and experiences" (Palincsar & Herrenkohl, 2002, p.26). These experiences are important for learning as they offer opportunities for learners to find inconsistencies between their current knowledge representations and those of their fellow learners. Through dialogue, learners may construct new knowledge representations (Bybee & Sund, 1982; Piaget,1985).

On the other hand, as Reeves, Herrington and Oliver (2004) pointed out, “Although many of the technological affordances of Blackboard, WebCT, and other course management systems can support the collaborative engagement of students ..., few instructors capitalize on these possibilities in their use of these tools”(p. 60). In fact, according to Reeves et al., many teachers who teach online courses are satisfied to “convert traditional courses into an online format without pedagogical change” (p.55).

Those that do try to incorporate collaborative activities encounter many challenges. For example, students involved in courses that use collaborative activities are expected to develop high-level cognitive skills such as negotiation of meaning and meta-cognition without the foundation of low-level skills such as online etiquette, web navigation and web searching (Zafeiriou, Nunes, & Ford, 2001; Lim, 2003). “As a consequence, students may feel compelled to undertake new methods of instruction and provision without being properly equipped with the basic abilities required for success in an online networked learning environment” (Zafeiriou, Nunes, & Ford, 2001, p. 83). Students can become frustrated with such a situation, and resent the extra time invested in order to succeed (Falvo & Solloway, 2003).

Furthermore, group work online can be difficult in a social sense. Just as personalities can conflict in a face-to-face setting, so can they do so in an online setting. Because of the lack of physical clues, miscommunications can easily occur. The distance may contribute to the idea that it is more difficult for a

teacher to help resolve conflicts as well. “When teachers facilitate collaborative group tasks in online environments, and group tensions emerge (as they inevitably do), [many teachers would like to] abandon collaborative work because it is too difficult” (Palincsar & Herrenkohl, 2002, p.57).

However, there is empirical evidence that concludes overcoming such challenges is worth the time and effort. For example, Jung, Choi, Lim and Leem (2002) did a quantitative study to look at the effects of three types of interaction on learner achievement: satisfaction, participation, and attitude towards online learning. They concluded that collaborative interaction brought the highest level of satisfaction with the learning experience.

Furthermore, Kirschner (2004) explained how society and industry want “graduates to be able to reflect upon what is needed, what the possible solutions are, what the repercussions of different solutions are, and then to make a well-considered decision” (p. 40). He felt that such learning “cannot be made operational in traditional didactic teaching settings that are more often than not both individual and competitive in nature…in other words, this can only be achieved in a collaborative or cooperative learning setting, often in electronic form”(p.40).

However, not everyone agrees upon exactly how online groups should collaborate. Fisher (2003) argued that asynchronous environments usually have a “lack of depth in discussions and critical thinking” (p.229). Reeves, Herrington and Oliver (2004) discussed the necessity of breaking the “credit-for-contact”

model of collaborative learning for the same reasons. Fisher (2003) advocated the incorporation of synchronous discussions because they require students "to be able to acquire, assess, understand, and then make decisions in those situations that require immediate action" (p. 230). Such learning experiences, according to Fisher (2003), lead to better retention and higher satisfaction and success rates because they help to build a learning community.

Learning communities allow for space: space for negotiation, reflection and meta-cognition. Such communities offer opportunities for deeper social connections from group identity (Amichai-Hamburger, 2005), and these connections will in turn offer students better learning experiences. While important, learning communities are not easy to create. As Winn (2002) explained, "simply creating a web site and assigning people to use it does not create a learning community" (p. 346). There should be structure. Wilson (1997) explained that constructivism is often interpreted as meaning low structure, and that by imposing predefined learning goals would interfere with the construction of meaning. However, Wilson (1997) went on to say that form is important in that it "provides the essential boundaries and structure for the created act" (p.4).

Collaborative group activities are one type of structure that encourages the building of learning communities. Palincsar and Herrenkohl (2002) went a step further by encouraging that roles be assigned within the groups. In this way, "responsibility is shared among all members" (p. 31), and this responsibility can grow into feeling responsibility for the group and group identity (Amichai-

Hamburger, 2005). Kirschner, Strijbos, Kreijns, and Beers (2004) defined such responsibility as “task ownership” which is influenced by both individual accountability and positive interdependence. Although online collaborative instructional design does not, as of yet, have a commonly agreed upon definition or scope, according to Kirschner et al. (2004), task ownership, along with task character and task control, are the defining factors of proper online collaborative design.

DEFINING ENGAGEMENT

The definition of engagement does not have a single, popular citation. In fact, it is common for researchers to offer their own definitions, and often, engagement is blended with factors related to motivation. However, as Bangert-Drowns and Pyke (2001) pointed out, although “intrinsic motivation may foster engagement, it does not differentiate attraction to superficial aspects of text and ‘mindful’ involvement. Simple conceptions of intrinsic motivation fail to address issues of volition, complex cognitive-affective-motivational acts that manage and implement goals in the face of distractions” (p. 216). Therefore, this study will compile several different definitions of engagement in an effort to ground a single definition in theory and previous research.

1. Engagement as Behavior. Phil Schlecty (as cited in Strong, Silver & Robinson (1995)), looked at engagement in terms of three exhibited characteristics: learners who are engaged are attracted to their work, are

persistent despite challenges and obstacles, and take visible delight in completing their work.

2. Involvement and Participation. Another way to look at engagement is to break it down into a combination of two ideas: user involvement and user participation. User involvement is the "mental or psychological state toward a system" and user participation is the "observable behavior during…the process of a system" (Hwang & Thorn, 1999, p. 230). That is, user involvement is the mental process, and user participation is the behavior with which one may observe that process. Marks (2000) is another researcher who defined engagement in terms of involvement and participation: "a psychological process, specifically, the attention, interest, investment and effort students expend in the work of learning"(p. 154).

3. Task Value and Attention. Metros (1999) discussed how engagement is achieved through task value:

> While the first phase of interaction is simply connection, it is the second phase – in which the user perceives whether or not the activity has value – that defines the intensity and determines the extent of engagement…The more attentive the user is, the more completely he or she is engaged. (p. 284)

It is the relevance of the information, or the "value" as Metros says it, more than the interaction, that keeps the user engaged. Jacques, Preece and Carey (1995)

seem to echo this idea. They stated that learners are engaged when the activity "holds their attention and they are attracted to it for intrinsic rewards"(p. 58).

4. Cognitive Processes and Meaningful Learning. Greg Kearsley and Ben Shneiderman (1998) defined engaged learning as part of their Engagement Theory, as "all student activities [which] involve active cognitive processes such as creating, problem-solving, reasoning, decision-making, and evaluation. In addition, students are intrinsically motivated to learn due to the meaningful nature of the learning environment and activities" (p. 20). This definition looks at both action seen and unseen, student value of learning content, as well as motivational factors.

5. Action of Motivation. Skinner, Wellborn and Connell (1990) defined engagement as "initiation of action, effort, and persistence on schoolwork, as well as their ambient emotional states during learning activities"(p. 24). They went on to say that engagement is the mediator between perceived control and good performance. Therefore, engagement is the behavior that exhibits the learner's attribution of performance. Pintrich and De Groot (1990) also looked at engagement as a behavior (learning strategies) that reflected motivational orientation and self-regulated learning. Their empirical study used a self-report survey to determine cognitive engagement through reporting on items of self-efficacy, intrinsic value, test anxiety, and the use of learning strategies.

6. Time On Task. Smeets and Mooij (1999) looked at time on task as a synonym for engagement, in such that time on task refers to those behaviors that

reflect the action of learning. They base this assumption on previous research of Branson (1988) and Atkins and Blisset (1989), wherein time on task positively correlated with learning acquired.

7. Independent of Teacher Solicitation. Lee and Anderson (1993) defined seven levels of engagement. The highest level defines a fully "engaged" student as being involved with a task independently of teacher solicitation.

8. Control and Level of Challenge. Csikszentmihalyi (1997) discussed how engagement is related to *intense concentration* in a medium called "flow". To reach the point of flow, one must "immerse [oneself] completely in the experience…the sense of time is distorted; hours seem to pass by in minutes" (Csikszentmihalyi, 1997, 29). Hilary McLellan (1996) explained Csikszentmihalyi's theory this way:

> …the key element of an optimum experience is that it is an end in itself. Even if an activity is initially undertaken for other reasons, it fully engages us as an end in itself, it becomes intrinsically rewarding. (p. 52)

Flow experiences involve a delicate balance of skills and challenge (Moneta & Csikszentmihalyi, 1996), attention and curiosity, as well as the individual's sense of being in control (McLellan, 1996; Ghani & Deshpande, 1994; Trevino & Webster, 1992). As McLellan (1996) explained, "The challenge should not be too great to interfere with the sense of flow; it should engage and test skills without frustrating them" (p. 6). According to Trevino and Webster

(1992), within computer interactions, flow consists of four dimensions: control, focus of attention, curiosity, and intrinsic enjoyment. Chen and McGrath (2003) looked at "optimal flow" and how it related to the engagement of students designing hypermedia documents. They defined engagement as "an enjoyable state of concentration" (p. 404), and their survey broke this down into enjoyment, concentration, perceived control, exploration, and perceived challenge. However, at the end of their study, they noted that such engagement was related to the "time and effort students invested" (p. 415) in their work.

Definition of Engagement. Based on a review of the literature, the following definition of engagement was created: Engagement describes the physical and mental state of a learner who is cognitively involved with a task. This state consists of three aspects: sustained time on task, persistence in spite of difficulties, and degree of flow.

ENGAGEMENT AND LEARNING

Many educators do not see value in engagement alone. As Yair (2000) pointed out, critics have cited how a student may learn more through low engagement in an activity if that activity is more conducive to learning than an activity that only results in a high level of engagement. Furthermore, a high level of engagement does not lead to learning if the curriculum is unsound (Yair, 2000).

Wong, Packard, Girod, and Pugh (2000) made a similar point about computer games.

> Students playing computer games seems to suggest a prototypical example of Csikszentmihalyi's (1990, 1996) flow. The concentration is intense; time passes but outside the notice of the students. Games are designed so players can find the optimum match between challenge of the game and the player's skill. If flow is optimal experience, then these gamers seem to be in the flow. The question that comes easily to mind, however, is to what degree is optimal experience optimal *educational* experience? (p. 329)

Furthermore, Wong, Packard, Girod, and Pugh (2000) discussed how, while a transformative experience, the world of computer games stays within that context, and is not a lasting one. On the other hand, instructional designers intend for educational experiences created in those same contexts to make lasting impressions. It is a paradox that is not easy to reconcile, and yet it is important to learn how to manipulate such an experience to open a realm of learning possibilities, for that is the advantage of technology. "When programs are designed around old teaching paradigms, students are confined to a narrow learning experience," (Stoney & Oliver, 1999), however by maximizing the benefits of technology, it may be possible to create such experiences that will enhance the learning process. Csikszentmihalyi (1997) explained that "…the

flow experience acts as a magnet for learning – that is, for developing new levels of challenges and skills" (p. 33).

Most educators concede that engagement is not only important to learning, but that learning can be viewed as one of the mental processes resultant from engagement. For example, to novice multimedia designers, advice such as "the more you engage your audience, the more they will enjoy themselves and the greater their message retention will be" (Franklin & Patton, 2000, p. 6) is often given. This is true not only for instructional designers, but also for advertisers, whether their created messages end up on the radio, television or print. If you engage the audience, they will remember the message. This concept can be just as applicable to learning: "People with an intrinsic interest in a theme learn more independently, persistently, and profoundly" (Schiefele, 1996 as quoted in Konradt & Sulz, 2001). Existing studies show the importance of engagement to learning success across diverse populations (Marks, 2000; Herrington, Oliver, & Reeves, 2003; Finn & Rock, 1997). Engagement is just as important for online learning: "In the online learning environment, engagement entails mindfulness, cognitive effort and the attention of the learners in that environment. When learners are engaged in the learning process, levels of learning and retention may be increased" (Lim, 2003).

This idea can be applied to educational research as well. Lee and Heller (1997) wanted to do a study about what visitors to a museum learned from a multimedia program. Because they felt it would be difficult to measure the

learning of infrequent guests, they decided to measure the engagement of the visitors. They looked at logs of recorded keystrokes to trace the path of interest of each visitor and timed each engagement. Using the idea that "exciting, computer-based learning environments" must have an element of engagement, the researchers hoped to establish a link between engagement and learning (Lee & Heller, 1997). They concluded that the longer a user was engaged in the system, the more varied the multimedia experience. However, this varied multimedia experience was not stated to be an increase in learning. On the other hand, Cognitive Flexibility Theory looks at how varied practice and examples can result in higher levels of transferability (Jonassen, Ambruso & Olesen, 1992; Sprio, Coulson, Feltovich & Anderson, 1988). Therefore, a theoretical argument can be made that engaged learners who spend more time on task will have a more varied experience, which leads to increased learning through the higher level of transferability of learning experiences.

Schifter (1999) pointed out that using multimedia in distance learning incorporates learning two curriculums: the explicit content and the "hidden curriculum." This hidden curriculum "includes the technology itself and the student as an active learner" (Schifter, 1999, p. 287). Lee and Heller (1997) also concluded that there was a need to separate the engagement with the technical system, where the user is only learning how to use the system, and the engagement with the content of the system. Engagement in the form of

multimedia can be as much of a distraction from the content as an enhancement for learning the content.

However, one could acknowledge that a student learning through multimedia may develop simultaneous learning strategies that incorporate both the technology and the content; in which case, learning the technology and learning the content become inseparable, as Kozma (1991) implied. One capability of technology is the opportunity to include visual animated representations along with text. Offering such mental models is important to the construction of knowledge, according to Bandura's Social Learning Theory. Sandra McCormick (1999) explained that, "at present, 60 percent of American students are visual dominant learners" (p. 55), and therefore, teachers should be willing to incorporate more visual learning. McCormick (1999) argued that visual media will "hold student attention," and the "visual learner will have a better chance of remembering the information": "Visual media is a powerful tool that can enhance learning and improve retention" (p. 57). One could conclude that visual media is one way to engage learners, and that such engagement enhances learning through the construction of visual mental models. McCormick did not offer empirical evidence to this claim; only a conviction that it is common knowledge that engagement leads to learning. Yet, it is without a doubt that engagement plays a major role in setting the stage for learning to take place.

ENGAGEMENT TO THE POINT OF FLOW

As explained earlier, the idea of flow originated with Csikszentmihalyi, and it represents the point of engagement where the student is in intense concentration and loses all sense of time and space. It is the balance of skills, challenge, and control. There have been a few empirical studies that look at the use of hypermedia to facilitate flow. One such study was done by Chan and Ahern (1999). They looked at how hypermedia can influence flow. To measure flow, they used a modified version of the FSS (The Flow State Scale), a self-report survey created by Jackson and Roberts (1992) to assess flow of athletes during sport participation. They found that multimedia could influence the motivation of students and facilitate flow, but only if used appropriately. They recommend a gradual integration of multimedia elements; otherwise, the overload of challenging content and distracting multimedia would upset the balance needed to obtain flow (Chan & Ahern, 1999). Konradt, Filip and Hoffman (2003) also found a correlation between the balance of challenge and skills and the attainment of flow within hypermedia contexts. They too used a self-report survey to measure flow.

However, another approach was to look at flow as a process rather than a state. Pearce, Ainley and Howard (2005) explained that it is the process that needs to be identified in order "to address the vexed issue of designing tasks that maintain students' engagement in online environments" (p. 3). They too focused

on the variables of skill and challenge, but instead of a survey at the end of an exercise, they used a probe to measure these throughout an exercise and then plotted to find a "flow path." However, while their survey indicated a correlation between flow and challenge and skill levels, the flow paths showed a different story, with a constant fluctuation of flow throughout. Furthermore, there were inconsistencies between the process and outcome measures of flow. Therefore, while it is reasonable to assume there is not a consistent state of flow, it is also necessary to realize that more must be researched about the process of flow.

Other studies have been done in the field of flow and online experience. One study looked at flow during online consumer experiences (Novak, Hoffman, and Duhachek, 2003). This study also used a self-report survey, and it compared levels of flow during goal-directed activities and experimental activities. The study found that flow was more likely to be facilitated through task-oriented activities rather than experimental activities. In terms of education, such a study offers empirical evidence that goal-directed activities may lead to a higher level of flow than activities in which students navigate without a clear, preset purpose.

Such clear purpose leads to finding value in doing a task. Finding value in a certain task can lead to engagement to the point of flow. Students need to "value what they are learning for its perceived self-relevance and potential life application (not just to enjoy the activities in which they are engaged)" (Brophy, 1999, p.85). Brophy (1999) pointed out that simple enjoyment of a task may lead

to intrinsic motivation, but that such motivation may “merely [catch] students’ interest and [may not] hold their interest in ways that lead to accomplishment of significant learning goals”(p. 83). Engagement to the point of finishing a task, otherwise known as volition (Corno, 1994), can be seen as persistence. However, this persistence can be tied to many things, such as life goals, challenge levels, intrinsic motivation, and task value (Husman, McCann, & Crowson, 2000). The question becomes one of instructional design. How can an instructional design offer a scaffolded schema that allows for a balance of challenge and skills, task value, and engagement to the point of flow, and therefore to a state of volition that ends in course completion and learner satisfaction? More research needs to be done that looks at how these ideas work together in a practical format.

COLLABORATION AND ENGAGED LEARNING

No matter how the collaborative activities are structured, what is important is what such activities can offer a student. Much more can be delivered than just content knowledge.

> “Where students are given opportunities to discuss and to interact, they can adapt their understandings and reflect upon them. An important factor in this process is the shared experience of learning. The open, democratic and collaborative power of the web can be a crucial way of engendering an active engagement in the learning process both

asynchronously and over time."(Hall, 2002, p. 152)

Hall pointed out that such collaborative activities allow for both reflection and broadening of understanding. It is through this "shared experience" that students become more engaged.

There is empirical evidence that supports this theory. Hall's study (2002) concluded that after six weeks of group-work, there was "deeper engagement from all except four students, evidenced by the task work, the quality of the dialogue, and the ways in which online discussions were fed into coursework"(p.157). In this study, one student shed light on one reason for this when he explained how it was helpful to discuss answers with other students because the varied answers allowed for new ideas to enter the discussion (Hall, 2002). Perhaps such broadening of understanding led to a deeper engagement of the subject matter.

Another study (Jung, Choi, Lim, & Leem, 2002) looked at the level of satisfaction of the learning experience between collaborative and academic interaction groups. Academic interaction groups of learners communicated with each other and with the teacher about the general content of the course, while the collaborative interactive groups worked together to solve a problem or about a specific topic. They found that the collaborative interaction groups reported having a higher level of satisfaction of the learning experience. Jung, Choi, Lim and Leem (2002) felt that the "active interaction with other students and collaboration in solving given problems…may have helped some students with a

lack of motivation to get others' help and, thus, overcome their motivational problems"(p. 160). It was this "enhanced learning motivation" that led to high satisfaction (Jung, et al., 2002).

There are others who connect the concept of engaged learning to collaboration. Barker and Bills (1999) explained in their indicators of engaged learning that "engaged learners are collaborative and empathetic" in that within a learning community, there must be an "understanding of others and an active recruitment of individuals by the group" (p. 3). This kind of engagement is echoed by Jones, Valdez, Nowakowski, and Rasmussen (1994) when they stated that "engaged learning also involves being collaborative – that is, valuing and having the skills to work with others" (p. 1). It would seem that there is a symbiotic relationship between engagement and collaboration. Through collaboration, students are given the opportunity to interact, reflect, and exchange ideas. Through this process, students seem to become more engaged. As they become more engaged, the learning community becomes successful, and the students have a more satisfied learning experience.

CONCLUSION

Engagement is defined as the physical and mental state of a learner who is cognitively involved with a task. This state consists of three aspects: sustained time on task, persistence in spite of difficulties, and degree of flow. Engagement is considered important to the learning process, as there is evidence that the

more a student becomes engaged in a task, the more likely the student will achieve a deeper understanding of the concepts and will be better able to achieve transferability of the concepts. CSCL seems to offer opportunities to support all three aspects of engagement, however, this remains largely untested.

The purpose of the present study is to explore differences in perceived levels of engagement by graduate students in online courses that include collaboration as a significant component of the course and graduate students in courses that emphasize individualistic learning. It is hypothesized that students in online classes that incorporate collaborative activities will have higher levels of engagement than students in online classes that emphasize individualistic learning activities.

Chapter 3: Method

The purpose of this study was to investigate the perceived levels of engagement levels between online students in courses including collaborative learning as a significant component of the course and students in courses emphasizing individualistic learning as part of an online instructional design. A study was designed to learn more about this relationship. The survey method was used so that inferences might be made regarding the population of online students in a graduate MBA online program (Babbie, 1990). It was assumed that an online survey would be the most convenient for potential participants to encourage participation. Therefore, a cross-sectional, self-administered survey instrument was created to measure engagement levels, and open-ended questions were included to learn more about how students felt about the collaborative aspects of their classes.

SAMPLE

The participants of this study were graduate students of an online Masters of Business Administration (MBA) program in Texas. The population consisted of 256 students from six online classes, three of which used collaborative activities in the instructional design. As the sample characteristics were determined through the survey data, a detailed description of the sample is discussed in the following chapter.

SAMPLING METHODS

The sampling method was not random, but purposeful in that the courses were selected based on the instructional design used. It was important to include both classes that incorporated collaborative activities and classes that provided individualistic learning activities. However, although the survey was offered to all of the students in the participating classes, in the end, student self-selection determined the sampling of the population.

The methodology of the study is as follows: First, all of the online instructors were emailed to enlist their assistance. The researcher then obtained permission from the participating schools. Of those instructors who agreed to participate, the researcher ascertained the instructional design of each class.

In the three control classes in the study, it was determined that they emphasized an individualistic approach to learning. Although communication between students, and between students and professor, was possible through discussion boards and direct email, such communication was not a requirement of the course. There was no element of necessary communication between students to complete a task or even participation-for-credit on the discussion boards. Such discussion boards were used for questions, concerns and clarifications. Two of the professors mentioned that the discussion boards were not often utilized.

In the three classes that incorporated collaborative activities as a significant component of the course, two of the classes were taught by the same

professor. In these two classes, there were two group projects, and the groups consisted of four or fewer students in each. The students were assigned to a group by the professor. The projects were separate from weekly discussions. Such discussions consisted of debates, in which each group argued a point based on material presented in the class, and then a group spokesperson posted the group's consensus on a class discussion board. The two group projects were group papers based on case studies. While only one paper was turned in per group and everyone in the group received the same grade for the project, there was also a formal peer evaluation. Students received a separate grade based on such evaluations.

In the third class taught by a different instructor, students were also assigned to groups, no fewer than three but no more than seven in number per group. Each group also had a group spokesperson that was responsible for communicating to the instructor and the class as a representative of the group. Each group selected an actual company. The group then used data about this company to provide analysis regarding the marketing of the company and its goods. The case analysis continued throughout the course, with ongoing discussions within the groups about how course material related to the chosen company. The project, due at the end of the semester, was a comprehensive case study of the chosen company. Only one complete study was turned in per group, and all the group members received the same grade. While there was no

formal peer evaluation, the professor did encourage students to discuss with him issues of participation if problems arose.

After ascertaining whether or not each class used collaborative activities or individualistic learning activities and to what extent such activities were used, the classes were categorized accordingly. After the IRB was approved, all of the students in these classes were invited to take the survey through an email recruitment letter. This letter explained the study and issues relating to consent and participant rights, and then had a link to an online survey. For purposes of analysis, each course had an identical while independent survey. However, for the three courses that used collaborative activities, there were two additional questions (Questions 43 and 44) in order to ascertain the relationship between collaboration and engagement.

INSTRUMENTATION

One challenge of this study was creating a survey instrument. While there are other studies that looked at engagement and used a survey instrument to measure engagement, each study defined engagement differently, and measured different constructs of engagement. Therefore, first it was necessary to determine a definition of engagement. Such a definition was compiled on the basis of theory, which is supported in the literature review, and should assist in the assertion of construct validity. Engagement was defined in terms of three attributes: Time on task, Persistence, and Flow. Flow was further defined in

terms of four attributes: Challenge, Information Value, Attention/interest, and Control.

Then a survey instrument was created by the researcher to measure these constructs within an online class. The survey instrument has 45 questions that use a modified Likert Scale, with a continuous scale of four choices: Usually, Sometimes, Rarely, and Never. There are then six questions that are open-ended. Finally, there are seven questions that ask general characteristics of the participants. Content validity is often determined by the judgments of experts (Gay, 1996), and to support content validity of this survey, two experts in the field reviewed the survey.

As for internal validity, the biggest concern revolves around the threat of History. The classes surveyed are different in content as well as have different instructors. There could be many possibilities for uncontrolled influence on engagement levels in these online classes.

A pilot study was undertaken to look at the performance characteristics of the survey, specifically the reliability of the test items. Graduate students of three classes of the Online MBA Program at the University of Texas at Arlington were the participants. First, online instructors were contacted to enlist their help to recruit their students for the study. An email recruitment letter was sent out to the students of three classes through the instructors. The email recruitment letter (see Appendix C) included information related to consent, the link to take the survey and an offer of a gift certificate to Amazon.com to encourage participation.

The survey (see Appendix A) was located online, with survey results stored in a database until downloaded. The survey had a low reliability rating in each of the tested components. For Time on Task, the coefficient alpha was .6685, for Persistence, the coefficient alpha was .7767, and for Flow, the coefficient alpha was .6412. Therefore, the survey was redone, using the items that had the highest reliability ratings, as well as many new questions.

VARIABLES

Dependent variable. There is one dependent variable, which is the engagement level of students in online classes. However, to determine this level, engagement is broken down into three attributes: Time on task, Persistence, and Flow. Flow is further broken down into Challenge, Value, Attention/interest, and Control. The table below explains how the survey breaks this down into test items.

Table 1: Survey Attributes

Time on Task	Questions 1, 3, 4, 9, 10, 26, 32
Persistence	Questions 5, 16, 19, 11, 27, 33
Flow - Challenge	Questions 8, 16, 17, 25, 31, 36, 39, 41, 43
Flow - Value	Questions 2, 20, 24, 29, 34, 37
Flow - Attention	Questions 2, 3, 6, 9, 14, 15, 18, 12, 28
Flow - Control	Questions 7, 13, 23, 30, 35, 38, 40, 42

Independent Variable. There is one independent variable, which is instructional design. The instructional designs investigated either have collaborative activity, or does not. By collaborative activity, it is meant that there is at least one activity within the course design wherein the online students must work together in small groups to complete some type of task.

PROCEDURES

First, instructors were contacted to elicit their support. Then, schools were contacted to obtain their permission for participation. Since the schools all used the UT Telecampus, the permission of the UT Telecampus had to be obtained as well. After UT IRB approval was obtained, the instructors who participated were asked a few questions to learn more about their course and for permission to review their courses. Then, each professor sent out an email recruitment letter to their students. In this way, the schools did not need to release any email addresses. The letter (see Appendix C) explained the study, issues of consent, and what is asked of them. The potential participants were offered a gift certificate to encourage their participation. Then, depending on the class, the students were directed to an online survey for their class. Each participating class had an identical but separate online survey, although the courses that used collaborative activities had two additional questions. In other words, the students all took the same survey, however the answers were stored by class. The data was stored in a database, and was downloaded directly into the researcher's

personal database to analyze. All participation was kept confidential, and separate from a list of replying email addresses used to send the complimentary gift certificate. No one besides the researcher had access to either the answers or the email addresses, and the researcher's computer was password protected.

DATA ANALYSIS

For all data analysis, the statistical program SPSS was used to calculate the necessary statistical equations.

First, descriptive statistics assisted in analyzing and describing the respondents. The descriptors of the respondents assisted in discussing issues related to response bias. Furthermore, the classes in the sample each have a more thorough description.

The 45-item Likert scale portion of the survey was analyzed by first doing reliability checks for internal consistency, using the Cronbach alpha statistic. After dropping some items that had a low reliability level, each response was given a numerical weight, keeping in mind the determination if each item was a positive or negative response toward engagement level. For each survey, the numbers were added. A high number determined a high level of engagement.

Then, a descriptive analysis of the data for all of the variables was analyzed. Engagement levels were reported in terms of means, standard deviations and range of scores. The means were compared through the use of the t-Test. The t-Test is an appropriate statistical test since there are two means,

the mean of the engagement levels of the students in the classes that included collaborative learning as a major component of the instructional design, and the mean of the engagement levels of the students in the classes that emphasized individualistic learning. Furthermore, the t-Test is appropriate because the means will be calculated from interval data.

The researcher also did statistical tests related to correlation. Using the Pearson product-moment coefficient, a simple coefficient test was done. The researcher was interested in the strength of the relationship between engagement characteristics and engagement levels. Then, the open-ended questions were coded and organized. This data was used to triangulate the quantitative data analysis, and to allow for a more holistic view of how collaborative activities affect engagement levels in online classes.

Chapter 4: Results

Engagement seems to be an integral part of a successful online educational experience, and may lead to higher retention rates in online courses. However, there is little empirical evidence that looks at how instructional design relates to engagement in online courses. Therefore, the goal of this study was to look at the relationship between engagement and instructional design, specifically designs that incorporated or did not incorporate collaborative activities. The research question guiding this study was: Do collaborative activities within an instructional design affect perceived engagement levels of students in online classes? As stated before, it was the hypothesis of this researcher that instructional designs that incorporate collaborative activities will lead to higher perceived engagement levels than those that incorporate individualistic learning.

SAMPLE DESCRIPTION

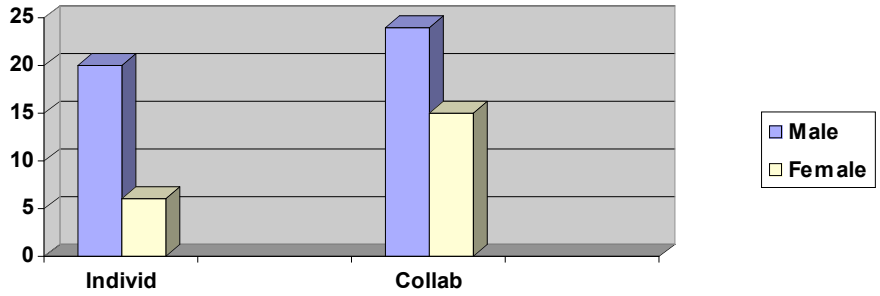
The population for this study was an online MBA program located in a Southwestern state. For the Spring Semester of 2006, a total of sixteen classes were offered. While seven instructors originally agreed to participate in the study, for a total of eight classes, only five actually did, for a total of six classes. However, the sample was not random, nor were the courses designed specifically for this study. On the other hand, while the sample was convenient, it

was also purposeful. Three of the classes used collaborative activities, and three did not use collaborative activities. Furthermore, while the courses covered different topics, all topics were related to business management.

The three courses that emphasized individualistic learning activities, taught by three different instructors, were similar in that all three classes did support opportunities for students to communicate with both the instructor and other students in discussion boards. However, none of the tasks assigned in these classes had the students working in groups to complete a single task. Of the 135 students in these three classes, 28 responded.

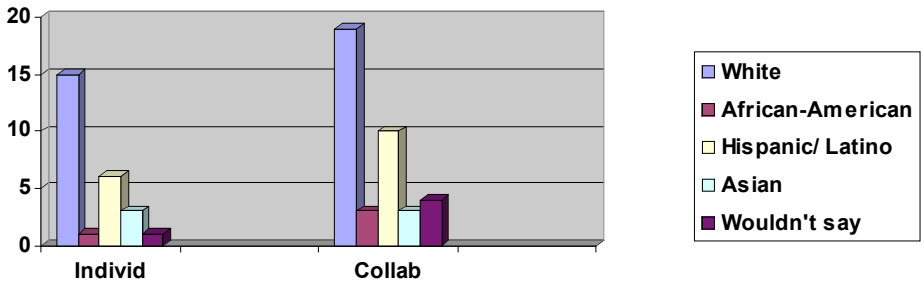
On the other hand, the other three classes did have such tasks. Two of the classes were taught by the same teacher. In these two classes, there were two group projects, where the students were assigned to the groups. The projects were group papers to be done over the course of a couple of weeks, and included peer evaluations. In the third class, taught by a different instructor, there was only one group project, where the students were also assigned to the groups. This group project was also a group paper to be done over the course of a couple of weeks, but there was not a required peer evaluation. Of the 121 students in these three classes, 40 students took the survey. While the courses were taught by different professors, the 66 participants of the study, separated into two groups of Individualistic and Collaborative, did have some common characteristics. In both groups of students, there were more male participants than female participants.

Figure 1: Gender of Participants



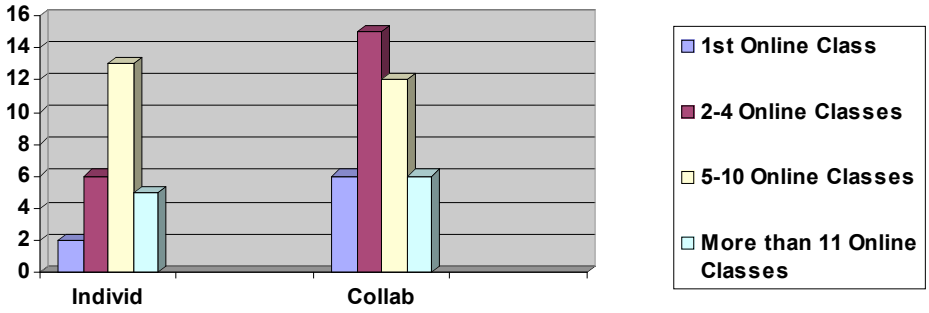
In both groups, there were more white participants than other ethnicities. However, in both groups, Hispanic/Latino participants made up the next highest number. Furthermore, there were Asian and African-American participants in both groups.

Figure 2: Race of Participants



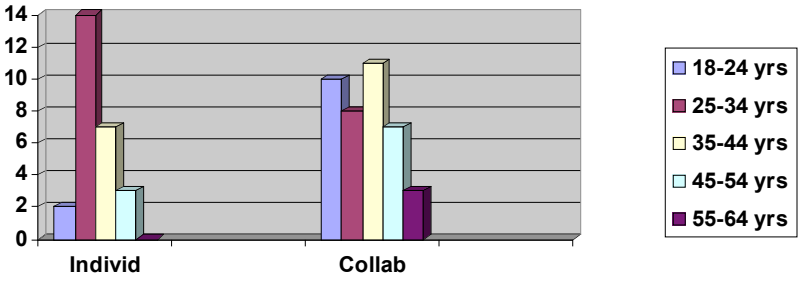
The largest difference in participant characteristics between the two groups seems to be that of online experience. The group with the students with more online experience was the group of students who were in the courses that emphasized individualistic learning activities.

Figure 3: Online Experience of Participants



Finally, while the range in age of the participants differed in each group, both groups had participants in all five categories.

Figure 4: Age of Participants



As can be seen in the charts above, there were similar proportions of males to females, as well as the ratio of ethnicities between the two groups. There was more variability when looking at the ratio of online class experience and age, however the variability was minimal.

RELIABILITY

The next step was to look at the survey instrument. The first time the survey was tested, the items had low reliability levels. Therefore, the survey instrument was modified. After this study, new reliability statistics were calculated using Cronbach's Alpha statistic. To obtain the best reliability levels, certain questions were dropped from the study. The following chart shows these results.

Table 2: Revised Survey Attributes

Engagement Charateristic	Questions	Cronbach's Alpha
Time on Task	1, 4, 9, 10	.696
Persistence	16, 19	.727
Flow – Challenge	17, 31, 36, 39, 41	.596
Flow – Value	2, 20, 24, 29, 34	.824
Flow – Attention	2, 3, 6, 9, 12, 14, 18, 21, 28	.834
Flow – Control	7, 13, 23, 30, 35, 38, 40, 42	.698
Flow – Total	Challenge, Value, Attention, Control	.847

DATA RESULTS

The survey results were coded and calculated. The mean of the engagement levels of the Individualistic groups was 61.4, with a standard

deviation of 12.1, while the mean of the engagement levels of the Collaborative groups was 66.7, with a standard deviation of 8.2.

Table 3: Group Statistics

	Respondent ID	N	Mean	Std Deviation	Std Error Mean
Total	>=42	25	61.6800	12.77276	2.55455
	<42	41	66.6829	8.20804	1.28188

To determine whether or not a significant difference existed between these two means, a t-Test was computed. The following charts look at these results.

Table 4: Independent Samples Test

		t-test for Equality of Means						
							95% Confidence Interval of the Difference	
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
TOTAL	Equal variances assumed	-1.940	64	.057	-5.00293	2.57888	-10.15483	.14898
	Equal variances not assumed	-1.750	36.230	.089	-5.00293	2.85814	-10.79822	.79237

In this study, the independent variable was instructional design and the dependent variable was engagement level. The null hypothesis (Ho) for the independent samples test was that there is no relationship between collaborative instructional designs and engagement levels. From the results of this test, the researcher rejects the null hypothesis, although the significance level was .057

assuming equal variances. This is very close to traditional significance, and therefore, it could be argued that the students in the classes with collaborative activities had significantly higher engagement levels than the students in classes that emphasized individualistic learning activities. However, there was still a 5.7 percent chance of a Type I error. Therefore, it was important to look at correlations to determine the strength of this relationship.

CORRELATIONS

Items were grouped to look at the correlation between characteristics of engagement and engagement levels. For Time on Task, all four items showed a strong positive correlation (Pearson correlation at approximately .4 for all four items) at the .01 significant level. For Persistence, one of the two items showed a strong positive correlation (Pearson correlation .3) at the .01 significant level. For Flow, there were 21 out of 31 items that showed a strong positive correlation at either the .01 (19 items) or .03 (3 items) significant level. Therefore, it would seem that there is a strong relationship between classes that use collaborative activities and higher engagement levels.

CODING OF SHORT ANSWERS

In order to look further into this relationship, short answer questions were coded to look for patterns (see Appendix B). Engagement was defined as a function of time on task, persistence, and flow, which is further broken down into

challenge, attention, value and control. Therefore, students with high levels of engagement would have answers that would code into these categories. However, while these topics were addressed in the answers, the data from the short answer questions had some unexpected results.

There were several answers that discussed issues relating to value and attention. Some students looked at the group projects as valuable in that they imitated real-life situations. One student said, "[What I found to be the most useful were] the activities that involved real life situations in an office setting. I find them useful because not everything is black and white so it requires thinking out of the box." Another student explained, "I liked the group project the most because [we] were able to choose a real world example instead of focusing on academic journals."

There were also several comments that explained how the group projects helped to keep their attention:

(1) "Working in a group keeps me focused,"

(2) "The activities that I had to complete with my team served to keep the "ball rolling" in the class. We would talk in different ways, via e-mail, phone, general postings, etc. This kept me interested in the class as far as keeping up with all the work and readings that had to be done,"

(3) "They definitely made me stay active. The group interaction helped maintain my interest," and

(4) "The group work helped me to stay focused on the task at hand."

The concept of control had two sides with this data. On one side, some students looked at this issue as control over themselves. Some of the comments were:

(1) "I think it made me accountable to [my group], as far as getting my side of the assignment completed so we could get a good grade," and

(2) "It kept me on top of my work, so others didn't suffer because of procrastination."

These students felt accountable to the group, and it was this feeling of accountability that kept them involved.

However, the other side of this issue is that some students felt the loss of control on the flip side of group accountability. While some students felt accountable to the group, many students felt that other group members did not feel as accountable to the group, and they felt the loss of control since they were dependent on their group members to do their share of the work. This dependability on their group members was stressful for many of the participants. Some of the comments that echo this include:

(1) "The assignments were not difficult, working in groups and depending on others completing portions were the most difficult,"

(2) "Having to complete projects with classmates has its good and bad points. I enjoy meeting and talking to new people, but sometimes depending upon them is taxing,"

(3) “I felt like the group assignments were the most challenging because you had to depend on your group members for some of the information and input,”

(4) “The tasks were not difficult but getting members to get organized to submit work on time for review prior to posting was very challenging.”

Finally, time on task and challenge had several aspects that were addressed in the comments. The most common comment, by far, about the challenges relating to online collaboration was the difficulties with coordination. First, there was the challenge of coordinating schedules. Some comments included:

(1) “[The collaborative activities were] definitely helpful, but the group process can be frustrating when you find yourself coordinating a variety of work schedules!”

(2) “I worked in a group of 5. Coordinating with the other students was difficult since everyone had full time jobs and varied schedules.”

(3) “Yes, it was useful in learning to work with a team long-distance, but very hard to find a time when everyone could meet at once.”

(4) “Getting everyone together was the most challenging thing to do.”

Secondly, there was the challenge of coordinating the workload. Many comments were in the line of “it was difficult sometimes to get everyone organized to complete the assignment,” “I liked the project, but coordination was the hardest part,” and “the biggest issue with the group piece is coordination

among group members." Some of the students felt that the challenge was not worth the result: "The group assignments always teach you a lot of working in real world environments, sometimes with people that you don't necessarily want to work with. However, having to coordinate online with a group is too challenging to actually be worthwhile." Furthermore, it seems that these problems with coordination are what most of the participants found the most time consuming, on what most of their time was spent.

QUESTIONS 43 AND 44

Finally, there were two extra questions in the surveys for the classes that had collaborative activities. Questions 43 and 44 were meant to measure how collaborative activities affected sustained interest and perceived usefulness in learning the course content. Seventy percent of the participants felt that the collaborative activities were usually or sometimes the biggest contributing factors to their sustained interest in the course. Furthermore, seventy-four percent of the participants felt that while the collaborative activities were hard work, they were usually or sometimes the most helpful in learning the information. One student explained why the hard work was worth the effort when he (or she) stated that,

> "The most challenging thing for me was working with my team. Not being face-to-face caused some miscommunication. Availability of all team members at the same time was definitely a challenge. Team members' different concepts of the timeline for completing the activities

(procrastinators working with proactive people) {sic}. These comments all sound rather negative, and certainly at times all of this was very frustrating however, the overall challenge is positive. This is real life. Managers and team members need to know how to handle these situations. In the classroom environment, it is your grade. In the work place, it is your job. Both are important...at least to me."

This comment shows a bit of insight in that while such a medium was time-consuming, difficult in feeling a loss of control, and at times stressful, all of such was a valuable learning experience in that it mirrored real life. Therefore, such learning experiences, while challenging in many ways, allowed for deeper, more varied learning through the facing of such challenges, and such experiences find far transfer value in that they may be utilized in real-life experiences.

Chapter 5: Discussion

EXPLANATION OF FINDINGS

The statistical results show that there is a positive relationship between collaborative activities and engagement levels. Students in the classes that had collaborative activities had higher engagement levels than students in the classes that emphasized individualistic learning activities. This finding addresses the original research question and supports the researcher's hypothesis.

Based on the theories grounded in the literature, it was assumed that collaborative activities would cause higher engagement levels because such activities would lead students to longer time on task since negotiation of meaning takes more time, more accountability which would lead to volition, and produce the right balance of challenge, interest, value and control as to lead to the student to be engaged to the point of flow. However, it is the short answer section of the study that shows there may be other reasons for the high engagement levels in the classes with collaborative activities. While students reported high levels of attention and value attributable to the collaborative activities, they also discussed other reasons which may account for the higher engagement scores.

First, there seems to have been higher levels of stress due to the feelings of loss of control. By that, it is meant that, according to the comments reported in

the short answer section of the survey, many students felt uncomfortable being dependent on the participation of other students. Some felt the need to do all the work "just in case" the other students in their group did not come through. In which case, some students may have spent more time with a class than what an instructor might have anticipated if all the students did not participate in the groups in a balanced manner.

Furthermore, also according to the short answer section, many students felt that although collaboration took place and the projects were completed, they spent more time coordinating schedules and workloads rather than arguing ideas and negotiating meaning. Such coordination could be a distraction to learning, and prove to be a larger challenge than covering the content itself. If this is the case, then such a challenge would upset the balance needed to achieve the state of engagement of flow. Therefore, while the engagement levels seem to be higher, it may not be attributable to the collaborative elements of the instructional design.

CONCLUSIONS

While there were statistical findings to support the theory that a collaborative instructional design will lead to higher engagement levels, it is important to remember that the sample was not random, and the results of such testing cannot be held to statistical rigor. On the other hand, such research can still be valuable on a practical level.

The statistical results support the theory that students may have higher engagement levels in courses that have collaborative activities. However, it is important to remember that while there was a high correlation between classes that have collaborative activities and higher levels of engagement, this does not mean that having collaborative activities will cause higher levels of engagement. As mentioned earlier, there are many elements that may contribute to student engagement, such as the student's personal motivation for learning, the prior knowledge and experience of the student in the subject area, and the quality of the course content. And, in fact, the comments by the participants do show a slightly different version than the picture presented through correlation statistics. If engagement is defined as time on task, persistence and flow, then perhaps it is necessary to understand on what exactly students are spending their time, why exactly do students feel the need to persist, and how exactly collaboration relates to flow. From the literature, it was theorized that collaborative activities would lead to more time on task because the process of negotiation takes more time. However, from the comments in the study, participants mentioned that most of their time was spent just trying to coordinate a time to meet. Although engaged in the course, time spent in this manner could not be considered cognitive engagement.

Furthermore, it was theorized that collaborative activities would lead to more volition, as students may feel responsible for the group. The comments of the participants support this theory, however the other side of the issue was not

previously considered. While responsibility for the group does lead to volition, there is also stress created by the dependency of other group members who sometimes do not feel quite as responsible. The group work provides both benefits and distractions. It is difficult to establish whether or not, in this instance, collaborative experiences are more helpful or detrimental to the learning experience.

Finally, the issue of flow seems decidedly split. On one hand, according to the results of the study, issues related to attention and value can be attributed to the group activities. However, issues related to challenge and control do not seem to have a direct educational link to the group activities. Instead, the challenges are more related to the coordination of schedules than to the level of difficulty of the activity, and as discussed earlier, about the feeling of loss of control when students feel they must become dependent on others to complete a task. Therefore, it cannot be said that collaborative activities directly lead to a state of flow, at least not from this study.

IMPLICATIONS

However, all of this is not to say that a collaborative instructional design is unworthy. Actually, many of the participants of the study mentioned that although such activities took more time, they found value in doing them, and their learning process benefited. There seems to be a sliding scale of how collaborative activities could either benefit or be detrimental to learning,

depending on several factors. Therefore, perhaps it is the design of such activities and how they are applied that may impact cognitive engagement.

Another aspect of the study is the research itself. This study was conducted over the course of three years, although the data reflects only one semester of classes. The small amount of data is the result of trying to coordinate online research. There are several challenges to completing this type of research.

First and foremost, there is the challenge of proper timing. At many colleges, prospective researchers may not contact instructors until the online course has "made." This means a researcher must wait until there are enough students enrolled in a course that it is carried through registration. Then, instructors can be enlisted to help in the research. Only after there are instructors willing to participate can the researcher apply for permission to do the study through that particular college. Then all the proper forms must go through in time to do an Institutional Review Board (IRB) proposal first with the participating college, and then at the college of the researcher. The nature of the research is such that there is only a short window in which to send a survey. Colleges do not like to give out student email addresses, so an alternative is to have the participating instructors send out the survey on a class list. Almost everything, from instructor response, to IRB approval to instructors remembering to send out the survey on a certain day, must go like clockwork in order to get the best possible response rate. This process is only exacerbated if the researcher

is not in close proximity to the target college, because it is very easy to ignore an email from a researcher. Researchers interested in doing this kind of study must be willing to be persistent, as inevitably there will be challenges to overcome in working with the different aspects involved.

If the timing works out, incentives may be used to encourage participation. In this study, prospective participants were offered a ten-dollar gift certificate to Amazon.com. If the semester projects are done early, it may also be possible to send out the survey twice, with a one-week interval between each submission. This reminder might encourage more participation. The experience derived from the current study underscores the importance of maintaining close communication with all parties involved. Repeated communication efforts with the instructors help the researcher to stay on top of deadlines, find out early about emerging problems, and provide reminders so that opportunities are not missed.

FURTHER STUDY

One of the more surprising aspects of the study was some of the comments about the collaborative activities made by some of the participants. One student did not think such activities were worthwhile “since the thinking of the students was in line with the “norm” that I have heard and read about before.” Another student was blunter by explaining that it was not useful “having to discuss the material with classmates who were very boring and conformists like a

train on a track." Finally, another student explained his (or her) dislike for the process by stating that, "No one wants to be corrected by another student and to be honest, I just don't care about the opinions of other students." Similar opinions are mentioned by other students in other research (Hall, 2002). Such comments are important to consider when examining the value of group work. Perhaps not all students benefit from multiple points of view, or perhaps multiple points of view are not as valuable as some learning theories purport.

In considering the results of the study, it is important to consider that the information on the nature of the collaborative learning activities was inferred from the syllabus and the learning materials. There are other factors that may positively or negatively impact the use of collaborative learning such as the scaffolding provided by the instructor, the monitoring and mentoring of the small group collaborative processes, the training provided the students in working collaboratively online and other important variables.

There has been empirical research along the lines of scaffolding and learner support (Thorpe, 2002), assignment of roles within the groups (Palincsar and Herrenkohl, 2002) and a look into how the composition of groups may play an important part of successful collaboration (Gabbard, 2000). More research needs to be done along these lines.

This study also leads to other lines of inquiry. The engagement instrument may be used in relation to other variables. This researcher is especially interested in how engagement levels are related to both attrition and

achievement. It is also hoped that further studies might look at other possible factors of engagement, such as location of online learning (are students more engaged from home rather than from a library?) and problem-based learning. Furthermore, it would be very interesting to explore the engagement levels of students who participate in problem-based learning activities in individualistic and collaborative online learning environments. Through such research, more could be understood about how engagement is affected, be it in a social or pedagogical aspect in online learning.

SUMMARY

This study used a self-report survey instrument to measure perceived level of engagement levels of six graduate-level online classes. The data was used to look at engagement levels of students in classes that incorporated collaborative activities as a significant component of the instructional design, wherein students worked together in small groups to complete a group project, and in classes that emphasized individualistic learning in the instructional design. The results showed a significant positive relationship between collaborative instructional design and engagement levels. However, the coded responses of the participants showed that while classes that use such activities had higher levels of engagement, perhaps the participants were engaged with other course-related concerns rather than cognitively engaged with the learning content. Engagement was defined as a state involving sustained time on task, persistence

and flow. However, different aspects of these factors emerged in the study. For example, many participants reported that the most time consuming and challenging aspect of the course was scheduling and coordination with group members. Furthermore, aspects of control included feeling a lack of control, as many participants indicated a sense of stress by being dependent on group members for successful completion of group projects. It is concluded that more research needs to be done to better understand if and under what conditions and forms the collaborative activities may be designed to enhance cognitive learning experiences.

Appendix A

SURVEY

Likert-type answers of Usually, Sometimes, Rarely, or Never.

Question - Question 1: I spend a lot of my time with course-related work.

V3 - Question 2: I am learning a lot from the activities I do in class.

V4- Question 3: It is difficult staying involved in my assignments for this class.

V5 - Question 4: As I work on various activities for this class, I do not realize the time going by.

V6 - Question 5: I feel like I want to give up the class because it is so difficult.

V7- Question 6: The assignments for this class are boring.

V8- Question 7: I feel that I have a lot of control in how I complete the tasks I have to do in this class.

V9- Question 8: The assignments are challenging, but able to be done, if I put enough effort into it.

V10- Question 9: I am so invovled in what I am doing when I work on activities for this class that I lose track of time.

V11- Question 10: I usually spend more time on course-work for this class than I initially intend to spend.

V12- Question 11: Although work for this course is at times demanding, I complete what needs to be done on-time.

V13- Question 12: As the weeks go by, I become more interested in this class.

V14 - Question 13: I wish I had more opportunities to incorporate my personal style in my assignments.

V15- Question 14: I find the assignments very interesting.

V16- Question 15: I am easily distracted from my work when I am doing class-related activities.

V17- Question 16: This class has very difficult times to get through.

V18- Question 17: The assignments are easily completed, with little effort on my part.

V19- Question 18: I enjoy doing the assignments for this class.

V20- Question 19: I want to quit the class because it is too difficult.

V21 - Question 20: I feel that the information I am learning in this class is valuable to me.

V22 – Question 21: The assignments for this class keep me interested in the course.

V23 – Question 22: I have found that I learn more from the tasks in this course that are the most challenging.

V24 – Question 23: I have many opportunities to incorporate my personal style into my assignments.

V25 – Question 24: I feel that I will use what I am learning in this class in the future.

V26 – Question 25: I found the tasks for this course to be very challenging.

V27 – Question 26: While working on tasks for this class, I often find myself thinking about other things.

V28 – Question 27: While there were times when I felt like it would be easier just to give up, I decided to push forward and do what was required of the course.

V29 – Question 28: While I may not be interested in all parts of this class, there are some activities that do grab my interest.

V30 – Question 29: The information that I am learning in this class will come in handy in the future.

V31 – Question 30: I don't feel I have much control over what I have to do for this course.

V32 – Question 31: I thought some of the tasks were difficult, but I was still able to do them.

V33 – Question 32: I am surprised when I realize how much time I have spent on tasks for this class.

V34 – Question 33: I kept doing what was required to pass this class, even when the work load increased or became more difficult.

V35 – Question 34: I think that the tasks I complete for this course are not a waste of time.

V36 – Question 35: I liked being able to choose when I participate in the course.

V37 – Question 36: Most of the tasks for this class are very easy.

V38 – Question 37: The information I have learned in this course is important.

V39 – Question 38: I think I had a lot of control over when and how often I worked on the course.

V40 – Question 39: Most of the tasks for this class are not much of a challenge.

V41 – Question 40: I feel I had choices in terms of how I am learning the information for this course.

V42 – Question 41: The tasks for this course are difficult, but if I take the time, I find I was able to do them.

V43 – Question 42: I felt I get to choose how I learn what I need to learn to pass this course.

V44 – Question 43: The activities where I had to work with another classmate to complete an assignment were the biggest contributing factors in my sustained interest in the course.

V45 – Question 44: I think the activities where I had to work with a classmate to complete a task were hard work but the most helpful in learning the information.

Short Answer:

Question 45: Did this class have an activity where you had to complete a task with a classmate? If yes, were these activities difficult? Were they useful?

Question 46: If yes to question 45, did the activity where you had to complete a task with a classmate help you to stay interested and active in the course? If no, please skip to question 47.

Question 47: Please respond briefly: Which activities in this course did you find the most interesting so far? What was interesting about them?

Question 48: Please respond briefly: Which activities in this course did you find the most useful to you in terms of what you learned by doing them? Why did you find them useful?

Question 49: Please respond briefly: On which activities did you spend the most time? What was time-consuming about them?

Question 50: Please respond briefly: Which activities were the most challenging to you? What was challenging about them, and did you find this challenge a positive or negative experience?

Question 51: Your age is_____?
Question 52: Your sex is _____?
Question 53: Is English your native (first) language?
Question 54: What is your racial identification?
Question 55: How many online classes have you taken (including this one)?
Question 56: Have you taken this survey in another class this semester?
Question 57: Your email address is_____?(Keep in mind that this address is only used to send your gift certificate, and is stored separately from your answers.)

Appendix B

CODING OF SHORT ANSWER QUESTIONS

Coordinate schedule

1. Yes, [the collaborative activities were] definitely helpful, but the group process can be frustrating when you find yourself coordinating a variety of work schedules! we all do things differently, and while I was reminded of this and the benefits, at times it was hard to find a mutually workable schedule
2. Yes, [the activities] they were difficult - it was hard coordinating with team members
3. We had several group assignments. They were difficult as far as timing for everyone. We had one member who did not participate. The group assignments were useful. We learned critical thinking, research, and teamwork.
4. All the semester we worked on team of 5. It was challenging since it was an online class and we all had different schedules.
5. Yes, the team activities were the most difficult, not because of the assignment, but because of the coordination required.
6. The most challenging thing for me was working with my team. Not being face-to-face caused some miscommunication. Availability of all team members at the same time was definitely a challenge. Team members different concepts of the timeline for completing the activities (procrastinators working with proactive people). These comments all sound rather negative, and certainly at times all of this was very frustrating however, the overall challenge is positive. This is real life. Managers and team members need to know how to handle these situations. In the classroom environment, it is your grade. In the work place, it is your job. Both are important...at least to me. [also value]
7. I worked in a group of 5. Coordinating with the other students was difficult since everyone had full time jobs and varied schedules.
8. Yes, it was useful in learning to work with a team long-distance, but very hard to find a time when everyone could meet at once.
9. The projects and team assignments. Getting everyone together was the most challenging thing to do. It was positive experience but I prefer to work alone.

Coordinating work

1. Yes, it was difficult sometimes to get everyone organized to complete the assignment.
2. In the group projects. The organizations and putting the ideas together was difficult because of the diversity of the group.
3. most challenging – Coordinating between other classmate team members.
4. Trying to get all of the group members to get their portions of group assignments done properly and timely was challenging.
5. The biggest issue with the group piece is coordination among group members. I also think that those that are closer to finishing their degree are not as apt to take a lead role in the groups as they have lead before and are looking forward to completing the program. This should be a consideration when forming groups.
6. The most challenging was organizing a team effort without ever talking to them until well into the project timeline.
7. The group assignments always teach you a lot of working in real world environments, sometimes with people that you don't necessarily want to work with. However, having to coordinate online with a group is too challenging to actually be worthwhile.
8. I liked the project, but coordination was the hardest part.

Time consuming -8/18 group project,

1. The activities were not extremely difficult, but certainly time consuming.
2. The activities were difficult only because of the time consumed trying to conduct online discussions. Very difficult to accomplish objectives and directions because having to keep up with the chat.
3. Spend most time - Coordinating between other classmate team members
4. Group projects were very time consuming.

Value

1. Yes, they were difficult but useful
2. Group projects. These were useful in learning to organize my thoughts and organize the way a team works, which is what most of us do in the real life as managers.
3. The activities that involved real life situations in an office setting. I find them useful because not everything is black and white so it requires thinking out of the box.
4. I liked he group project the most because were able to choose a real world example instead of focusing on academic journals.

Individual work – No value

1. The term paper was very challenging because there were so many strict format requirements and the topic did not seem to be something that I could apply to real life.
2. The individual term paper that focused on academic journals was most challenging only because it was so boring.

Problems with Group

1. Yes, and these activities were made VERY difficult BECAUSE they had to be completed by the group. The activities themselves were useful, but the tasks were more difficult than they had to be because of the particular group members.

Having to Depend on Others

1. Yes, all assignments, with exception of the mid-term and final test, we group related. The assignments were not difficult, working in groups and depending on others completing portions were the most difficult.
2. Having to complete projects with classmates, has it good and bad points. I enjoy meeting and talking to new people, but sometimes depending upon them is taxing.
3. I felt like the group assignments were the most challenging because you had to depend on your group members for some of the information and input.
4. Trying to get all of the group members to get their portions of group assignments done properly and timely was challenging.
5. The tasks were not difficult but getting members to get organized to submit work on time for review prior to posting was very challenging

Attention/Focus

1. Yes, working in a group keeps me focused.
2. Yes. The activities that I had to complete with my team served to keep the "ball rolling" in the class. We would talk in different ways, via e-mail, phone, general postings, etc. This kept me interested in the class as far as keeping up with all the work and readings that had to be done.
3. They definitely made me stay active. The group interaction helped maintain my interest.
4. The group work helped me to stay focused on the task at hand.

Accountability

1. I think it made me accountable to them, as far as getting my side of the assignment completed so we could get a good grade.
2. It kept me on top of my work, so others didn't suffer because of procrastination.

Not always helpful

1. I have been in classes where I felt obligated to a team and pushed harder because I did not want to let the team down. However, I did not feel that pressure in this class. The viewpoint of other team members usually add to the learning experience. That was not the case in this class.
2. No since the thinking of the students was in line with the "norm" that I have heard and read about before.
3. Having to discuss the material with classmates who were very boring and conformists like a train on a track.
4. The group assignments always teach you a lot of working in real world environments, sometimes with people that you don't necessarily want to work with. However, having to coordinate online with a group is too challenging to actually be worthwhile.
5. No one wants to be corrected by another student, and to be honest, I just don't care about the opinions of other students.

Survey 506 – Help to stay interested? 6 yes, 5 no
Survey 406 – 14 yes, 3 no
Survey 706 – 4 yes, 1 no

43. The activities where I had to work with another classmate to complete an assignment were the biggest contributing factors in my sustained interest in the course.

406 – Usually – 5	506 – Usually – 3	706- Usually - 2
Sometimes – 9	Sometimes – 7	Sometimes - 2
Rarely - 4	Rarely – 3	Rarely - 1
Never – 3	Never – 1	Never – 0

28/40 70%

44. I think the activities where I had to work with a classmate to complete a task were hard work but the most helpful in learning the information.

406-Usually - 4	506- Usually-1	706- Usually-1
Sometimes-12	Sometimes-10	Sometimes-1
Rarely - 2	Rarely-1	Rarely- 3
Never - 3	Never-1	Never-0

29/39 74%

Appendix C

EMAIL RECRUITMENT LETTER/ CONSENT FORM

Dear Student,

My name is Ondrea Quiros. I am a student at the University of Texas at Austin, and I am conducting a research study. I would really appreciate it if you could take approximately 20 minutes to complete a simple, online survey.

The survey is about engagement in online classes. I am interested in what makes students stick with an online course through to completion. The purpose of this study is to assess the engagement level of students participating in different types of online course designs. It is hoped that this research will lead to better designed online classes. The survey asks simple questions to learn more about how you, as an online student, feel and behave in relation to your online course. All responses will be kept confidential.

I know that you are very busy, therefore to encourage participation in the next TEN DAYS, **I am offering a ten-dollar gift certificate good for redemption at Amazon.com for those who take the survey**. Please note that your participation is completely voluntary, and you can refuse to participate without penalty or loss of benefits to which you are otherwise entitled. Also, your participation will in no way affect, either in a beneficial or detrimental way, your status in your current online course. Your instructor will not know if you participated in the study. Also please note that your email address will **only** be used to send you your appreciation certificate. The participants' email addresses are reported separately from the responses, so the addresses and responses cannot be matched.

Furthermore, you do not have to answer every question to receive the gift certificate. Any question that makes you feel uncomfortable, or that you simply don't want to answer, you can just skip. You will still receive the gift certificate for taking the survey.

Please read and think about the information below in the Consent Form. Please note that your voluntary participation in the survey implies your consent to be a part of the study. If you would like to participate in the study, just click on the following link:
http://www.AdvancedSurvey.com/default.asp?SurveyID=34083

Thank you for your time and consideration, and I really appreciate your help. If you have any questions about the study, please feel free to call me at 850-651-3062.

Sincerely,

Ondrea Quiros

Informed Consent Form and Frequently Asked Questions

Title of Research Study:
The Relationship Between Instructional Design and Engagement in Undergraduate Online Classes

Principal Investigator(s) (include faculty sponsor), UT affiliation, and Telephone Number(s):

Principal Investigator: Ondrea Quiros, 850-651-3062
Faculty Sponsor: Paul E. Resta, Ph.D.
Learning Technology Center
512-471-4014

Funding source: N/A

What is the purpose of this study?

The purpose of this study is to use survey data to analyze student engagement in online courses that employ different instructional designs. Participation is voluntary, and it is hoped that 80 students will choose to participate in the study. This study will be used in a dissertation by the Principal Investigator, Ondrea Quiros.

What will be done if you take part in this research study?

You were selected as a possible participant because you are part of an online class. Your instructor was contacted to obtain permission to send you and your classmates this request for participation. If you choose to take part in this study,

you will click on a link that will take you to an online survey that will take approximately 20 minutes to complete. The questions will ask you about your feelings and behaviors in reference to your online class. Your responses will be kept confidential, and stored in a database. Please note that you are not required to answer every question. If there is any question that makes you feel uncomfortable, please skip it.

What are the possible discomforts and risks?

The possible risks are minimal; however, there may be risks that are unknown at this time. One concern is the possibility of a loss of confidentiality because your email address is requested at the end of the survey. However, your responses are stored separately from your email address. The email addresses will be reported as one long email address book, with no indication of which responses was reported with that email address. It would be very difficult to somehow match the email address with submitted responses. Furthermore, your email address will ONLY be used to send to you an appreciation gift certificate for taking the survey. If you wish to discuss the information above or any other risks you may experience, you may call the Principal Investigator listed on the front page of this form.

What are the possible benefits to you or to others?

There may not be any direct benefit to you for participating in this study. However, it is hoped that this study will aid in the development of better designed online classes.

If you choose to take part in this study, will it cost you anything?

No, it will not cost you any money to take part in this study, but it will cost you approximately 20 minutes of your time.

Will you receive compensation for your participation in this study?

Yes, you will receive a ten-dollar gift certificate to Amazon.com for participating in the study. You will receive the certificate no later than two weeks after your participation.

What if you are injured because of the study?

No medical treatment will be provided or available in case of injury as a result of participation in this study. However, it is very unlikely that any such injury will result.

If you do not want to take part in this study, what other options are available to you?

Participation in this study is entirely voluntary. You are free to refuse to be in the study, and your refusal will not influence current or future relationships with The University of Texas at Austin. Furthermore, your participation in this study will neither benefit nor detriment your status in your current online classes.

How can you withdraw from this research study and who should you call if you have questions?

If you wish to stop your participation in this research study for any reason, you should contact: Ondrea Quiros at (850) 651-3062. You are free to withdraw your consent and stop participation in this research study at any time without penalty or loss of benefits for which you may be entitled. Throughout the study, the researchers will notify you of new information that may become available and that might affect your decision to remain in the study.

In addition, if you have questions about your rights as a research participant, please contact Clarke A. Burnham, Ph.D., Chair, The University of Texas at Austin Institutional Review Board for the Protection of Human Subjects, 512/232-4383.

How will your privacy and the confidentiality of your research records be protected?

Authorized persons from The University of Texas at Austin and the Institutional Review Board have the legal right to review your research records and will protect the confidentiality of those records to the extent permitted by law. If the research project is sponsored, then the sponsor also has the legal right to review your research records. Otherwise, your research records will not be released without your consent unless required by law or a court order.
If the results of this research are published or presented at scientific meetings, your identity will not be disclosed.

Will the researchers benefit from your participation in this study?

Yes, the Principal Investigator will benefit. First, the results of the study will enable the Principal Investigator to compare two instructional designs in online classes. Then, this study will hopefully be presented as a dissertation and published, and in this way shared with other researchers.

As a representative of this study, I have explained the purpose, the procedures, the benefits, and the risks that are involved in this research study. You have been informed about this study's purpose, procedures, possible benefits and risks, and you have received a copy of this Form. Feel free to print this email and keep it for your records. You have been given the opportunity to ask questions before you take the survey, and you have been told that you can ask other questions at any time. You voluntarily agree to participate in this study. By agreeing to take this survey, you are not waiving any of your legal rights. However, by voluntarily taking the survey, you are implying your consent to participate in this study.

IRB#_2006-03-0047_

Bibliography

Amichai-Hamburger, Y. (2005). Internet minimal group paradigm. *CyberPsychology & Behavior*, 8(2), 140-142.

Atkins, M. & Blissett, G.(1989). Learning activities and interactive videodisc: an exploratory study. *British Journal of Educational Technology*, 20(1), 47-56.

Babbie, E. (1990). *Survey research methods* (2nd ed.). Belmont, CA: Wadsworth.

Bandura, A. (1977). *Social Learning Theory*. New York: General Learning Press.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 37, 122-148.

Bangert-Drowns, R. & Pyke, C. (2001). A taxonomy of student engagement with educational software: An exploration of literate thinking with electronic text. *Journal of Educational Computing Research*. 24(3), 213-234.

Barker, B. & Bills, L. (1999). Engaged learning using the Internet: SURWEB as a student-focused learning tool. Paper presented at the 91st Annual Conference of the National Rural Education Association, Colorado Springs, Colorado, October 13-17, 1999.

Brandsford, J.D. & the Cogition and Technology Group at Vanderbilt. (1992). The Jasper experiment series as an example of anchored instruction: theory, program description, and assessment data. *Educational Psychologist*, 27, 291-315.

Branson, R.K.(1988). *Educational Uses of Interactive Video Discs in the United States*, European Institute of Education and Social Policy, Paris.

Bruner, J. (1966). *Toward a Theory of Instruction*. Cambridge, MA: University Press.

Bybee, R.W. & Sund, R.B. (1982). *Piaget for Educators* (2nd Ed). Columbus, OH: Charles Merrill.

Campione, J., Brown, A. & Jay, M. (1992). Computers in a community of users. In E. Decorte, M.C. Linn, H. Mand, & L. Verschaffel (Eds.). *Computer-based learning environments and problem solving*. (NATO ASI Series F: Computer and System Sciences, Vol. 84, pp. 163-188). Berlin: Springer-Verlag.

Carr, S. (2000). As distance education comes of age, the challenge is keeping the students. *Chronicle of Higher Education*, 46(23), A39-A41.

Chan, T. & Ahern, T. (1999). Targeting motivation – adapting flow theory to instructional design. *Journal of Educational Computing Research*, 21(2), 151-163.

Chen, P. & McGrath, D.(Spring 2003). Moments of joy: Engagement and conceptual learning in the design of hypermedia documents. *Journal of Research on Technology in Education*, 35(3), 402-422.

Clark, R.E. (1983). Reconsidering research on learning from media. *Review of Educational Research*, 53(4), 445-459.

Collis, B. (1998, December). New didactics for university instruction: why and how? *Computers & Education*. 31(4), 373-393.

Corno, L. (1994). Student volition and education: Outcomes, influences, and practices. In D.H. Schunk , & B.J. Zimmerman (Eds.), *Self-regulation of Learning and Performance* (pp. 229-254). Hillsdale, NJ: Erlbaum.

Csikszentmihalyi, M. (1997). *Finding Flow: The psychology of engagement with everyday life*. New York: Basic Books.

Dalgarno, B. (2001). Interpretations of constructivism and consequences for computer assisted learning. *British Journal of Educational Technology*, 3(2), 183-194.

Dede, C. (1995). The evolution of constructivist learning environments: immersion in distributed virtual worlds. *Educational Technology*. 35(5), 46-52.

Falvo, D. & Solloway, S. (2003). Constructing community in a graduate course about teaching with technology. *TechTrends*, 48(5), 56-85.

Finn, J.D., & Rock, D.A. (1997). Academic success among students at-risk. *Journal of Applied Psychology*, 82, 221-234.

Fisher, M. (2003). Online collaborative learning: Relating theory to practice. *Journal of Educational Technology Systems*, 31(3), 227-249.

Franklin, D. & Patton, Brooks. (2000). *Flash 4! Creative Web Animation*. Berkeley: Macromedia Press.

Frankola, K. (2001, June). The e-learning taboo: high dropout rates in online courses. *Syllabus*, 14(11), 14-16.

Gabbard, R. (2000). Constructivism, hypermedia, and the world wide web. *CyberPsychology*, 3,(1), 103-110.

Gagne, R.M., Briggs, L. & Wager, W.W. (1988). *Principles of Instructional Design* (2nd ed.). New York: Holt, Rinehart and Winston.

Gay, L.R.(1996). *Educational research: Competencies for analysis and applications* (5th ed.). Upper Saddle River, NJ: Prentice Hall.

Ghani, J. & Deshpande, S. (1994, July). Task characteristics and the experience of optimal flow in human-computer interaction. *Journal of Psychology*, 128(4), 381-392.

Hall, R. (2002). Aligning learning, teaching and assessment using the web: an evaluation of pedagogic approaches. *British Journal of Educational Technology*, 33(2), 149-158.

Herrington, J., Oliver, R., & Reeves, T.C. (2003). Patterns of engagement in authentic online learning environments. *Australian Journal of Educational Technology*, 19(1), 59-71.

Husman, J., McCann, E. & Crowson, H. (2000). Volitional strategies and future time perspective: embracing the complexity of dynamic interactions. *International Journal of Educational Research*, 33, 777-799.

Hwang, M. & Thorn, R. (1999). The effect of user engagement on system success: A meta-analytical integration of research findings. *Information & Management*. 35, 229-236.

Jackson, S., & Roberts, G. (1992). Positive performance states of athletes: Toward a conceptual understanding of peak performance. *The Sports Psychologist*, 6, 56-171.

Jacques, R., Preece, J., & Carey, T. (1995, Spring). Engagement as a design concept for multimedia. *Canadian Journal of Educational Communication*, 24(1), 49-59.

Johnson, D.W., Johnson, R.T. & Smith, K. A. (July/August 1998). Cooperative learning returns to college: what evidence is there that it works? *Change*, 30(4), 26-35.

Jonassen, D., Ambruso, D. & Olesen, J. (1992). Designing hypertext on transfusion medicine using cognitive flexibility theory. *Journal of Educational Multimedia and Hypermedia,* 1(3), 309-322.

Jones, B., Valdez, G., Nowakowski, J., & Rasmussen, C. (1994). *Designing Learning and Technology for Educational Reform*. Oak Brook, IL: North Central Regional Educational Laboratory. Meaningful, engaged learning. Retrieved on 8/6/02, at http://www.ncrel.org/sdrs/engaged.htm

Jung, I., Choi, S., Lim, C. & Leem, J. (2002). Effects of different types of interaction on learning achievement, satisfaction and participation in web-based instruction. *Innovations in Education and Teaching International*, 39(2), 153-162.

Kearsley, G. & Shneiderman, B. (1998). Engagement theory: a framework for technology-based teaching and learning. *Educational Technology*, 38(5), 20-23.

Kennedy, C. (2001). Can online technology enhance student engagement & learning?. Retrieved on 11/11/2002 at http://www.smccd.net/accounts/kennedyc/rsch/research.htm

Kirschner, P. (2004). Design, development, and implementation of electronic learning environments for collaborative learning. *Educational Technology, Research & Development*, 52(3), 39-46.

Kirschner, P., Strijbos, J., Kreijns, K., & Beers, P. (2004). Designing electronic collaborative learning environments. *Educational Technology, Research & Development*, 52 (3), 47-66.

Knowles, M. (1975). *Self-Directed Learning*. Chicago: Follet.

Knowles, M. (1984). *Andragogy in Action*. San Francisco: Jessey-Bass.

Konradt, U., Filip, R & Hoffman, S. (2003). Flow experience and positive affect during hypermedia learning. *British Journal of Educational Technology*, 34(3), 309-327.

Konradt, U. & Sulz, K. (2001). The experience of flow in interacting with a hypermedia learning environment. *Journal of Educational Multimedia and Hypermedia*, 10(1), 69-84.

Koschmann, T.D. (1994). Toward a theory of computer support for collaborative learning. *Journal of the Learning Sciences*, 3(3), 219-225.

Koschmann, T.D. (1996). Paradigm shifts and instructional technology: an introduction. In T.D. Koschman (Ed.), *CSCL, theory and practice of an emerging paradigm* (pp. 1-21). Mahwah, NJ: Erlbaum.

Kozma, R. (1991). Learning with media. *Review of Educational Research*, 61(2), 179-212.

Kumar, V.S. (1996). Why Collaborative Learning? Retrieved on 7/12/2006 at http://www.cs.usask.ca/grads/vsk719/academic/890/project2/node7.html

Lave, J. & Wenger, E. (1991). *Situated learning: Legitimate peripheral Participation*. Cambridge, UK: Cambridge University Press.

Lee, O. & Anderson, C.W.(1993). Task engagement ad conceptual change in middle school science classrooms. *American Educational Journal*, 30(3), 585-610.

Lee, S. & Heller, R. (1997). Use of a keystroke log file to evaluate an interactive computer system. *Computers in Education*, 29(2/3), 89-101.

Lim, C. (2003). Engaging learners in online learning environments. *TechTrends*, 48(4), 16-23.

Lorenzetti, Jennifer. (2005, June 1). Secrets of online success: Lessons from the community colleges. *Distance Education Report*, 9 (14), 3.

Marks, H. (2000, Spring). Student engagement in Instructional activity: patterns in the elementary, middle and high school years. *American Educational Research Journal*, 37(1), 153-184.

McCormick, S. (1999, August). The case for visual media in learning. Syllabus. 55-58. [Online] Available at http://www.syllabus.com/

McConnell, D. (1994). *Implementing Computer Supported Co-operative Learning*. London: Kogan Page.

McLellan, H. (1996, November/December). 'Being Digital': Implications for education. *Educational Technology*, 36(6), 5-19.

Metros, S. (1999). Making Connections: A model for on-line interaction. *Leonardo*. 32(4), 281-291.

Molebash, P. (1999). Technology and Education: Current and Future Trends. *IT Journal* [Online]. Retrieved on 2/12/2001 at htttp://etext.virginia.edu/journals/itjournal/1999/molebash.html

Moneta, G. & Csikszentimihalyi, M. (1996). The effect of perceived challenges and skills on the quality of subjective experience. *Journal of Personality*, 64(2). Reprint of Duke University Press, 1996.

Moody, J. (2004). Distance education: Why are the attrition rates so high? *The Quarterly Review of Distance Education*. 5(3), 205-210.

Moore, M. (1980). Independent study. In *Redefining the Discipline of Adult Education*, eds. Boyd, R., J.W. Apps and Associates, 16-31. San Francisco: Jossey-Bass.

Moore, M. (1989). Editorial: Three Types of Interaction. *The American Journal of Distance Education,* 3(2), 1-7.

Moore, M. (1991). Editorial: Distance education theory. *The American Journal of Distance Education*, 5(3), 1-6.

Moshman, D. (1982). Exogenous, endogenous and dialectical constructivism *Developmental Review*, 2, 371-384.

Nathan, M. & Robinson, C. (2001). Considerations of learning and learning research: Revisiting the "media effects" debate. *Journal of Interactive Learning Research*, 12(1), 69-88.

National Center for Education Statistics. (2000-2001). Distance education at postsecondary education institutions: 2000-2001. U.S. Department of Education (NCES 2000-013). Retrieved 9/22/2003 from: http://nces.ed.gov/surveys/peqis/publicaitons/2003017/

Novak, T., Hoffman, D., & Duhachek, A. (2003). The influence of goal-directed and experiential activities on online flow experiences. *Journal of Consumer Psychology*. 13(1-2), 3-16.

NUA (2001, February). How many online? NUA Internet Surveys. Retrieved 3/8/2001 from: http://www.nua/surveys/how_many_online_/index.html

O'Malley, C., & Koschmann, T.D. (1993). Tutorial on using computers to support collaborative learning. Presented at InterCHI '93, Amsterdam, The Netherlands.

Ormrod, J.E. (1999). *Human Learning* (3rd ed.). Upper Saddle River: Merrill.

Palincsar, A. & Herrenkohl, L. (2002). Designing collaborative learning contexts. *Theory Into Practice*, 41(1), 26-32.

Parker, A. (1995). Distance education attrition. *International Journal of Educational Telecommunications*. 1(4), 389-406.

Patsula, P.(1999). Applying learning theories to online instructional design. Retrieved on 10/29/02 at http://www.patsula.com/usefo/webbasedlearning /tutorial_theories_full_version.htm#bruner

Pearce, J., Ainley, M., & Howard, S. (2005). The ebb and flow of online learning. *Computers in Human Behavior*, 21(5), 745-771. Accessed online through Science Direct on 8/22/2005 at http://www.sciencedirect.com

Piaget, J. (1985). *The equilibration of cognitive structures: The central problem of intellectual development*. Chicago: University of Chicago Press.

Pintrich, P.R & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, 82(1), 33-40.

Reeves, T., Herrington, J., and Oliver, R. (2004). A development research agenda for online collaborative learning. *Educational Technology Research & Development*, 52(4), 53-65.

Russell, T. (1999). *No significant difference phenomenon*. International Distance Education Certification Center (IDECC). Retrieved on 12/5/2002 at http://teleeducation.nb.ca/nosignificantdifference/

Salomon, G. Perkins, D.N. & Golberson, T. (1992). Partners in cognition: Extending human intelligence with intelligent technologies. *Educational Researcher*, 20(3), 2-9.

Scardamalia, M., & Bereiter, C. (1991). Higher levels of agency for children in knowledge building: A challenge for the design of new knowledge media. *The Journal of the Learning Sciences*, 1, 37-67.

Schifter, C. (1999). Teaching in the 21st century. *The Internet and Higher Education*. 1(4), 281-290.

Sims, R. (2003). Promises of Interactivity: Aligning learner perceptions and expectations with strategies for flexible and online learning. *Distance Education*, 24(1), 87-103.

Skinner, E., Wellborn, J. & Connell, J. (1990). What it takes to do well in school and whether I've got it: a process model of perceived control and children's engagement and achievement in school. *Journal of Educational Psychology*, 82(1), 22-32.

Sloan-C, (2006). Making the Grade: Online education in the United States, 2006. Retrieved on 11/11/2006 at http://www.sloan-c.org/publications/survey/index.asp

Smeets, E. & Mooij, T. (1999). Time on task, interaction, and information handling in multimedia learning environments. *Journal of Educational Computing Research*, 21(4), 487-502.

Spiro, R.J., Coulson, R.L., Feltovich, P.J., & Anderson, D. (1988). Cognitive flexibility theory: advanced knowledge acquisition in ill-structured domains. In V. Patel (ed.), Proceedings of the 10th Annual Conference of the Cognitive Science Society. Hillsdale, Nj: Erlbaum. [Reprinted in Ruddell, R.B. & Ruddell, M.R. (1994). *Theoretical Models and Processes of Reading* (4th Ed.). Newark, DE: International Reading Association.]

Stahl, G. (2005). Group cognition in computer-assisted collaborative learning. *Journal of Computer Assisted Learning*, 21, 79-90.

Stoney, S., & Oliver, R. (1999). Can higher order thinking and cognitive engagement be enhanced with multimedia?. *Interactive Multimedia Electronic Journal of Computer-Enhanced Learning.* Retrieved on 2/12/2001 at http://imej.wfu.edu/articles/1999/2/07/index.asp

Strong, R., Silver, H., & Robinson, A. (1995, September). What do students want (and what really motivates them)? *Educational Leadership*, 53(1), 8-13.

Sutherland, R. Facer, K., Furlong, R., & Furlong, J. (2000, April 1). A new environment for education? The computer in the home. *Computers & Education*. 34(3-4), 195-212.

Terry, N. (2001, February). Assessing enrollment and attrition rates for the online MBA. *T.H.E. Journal*. 28(7), 64-68.

Thorpe, M. (2002). Rethinking learner support: the challenge of collaborative online learning. *Open Learning*, 17, (2), 105-119.

Trevino, L. & Webster, J. (1992, October). Flow in computer-mediated communication. *Communication Research*, 19(5), 539-574.

van Bruggen, J.M., Kirschner, P.A., & Jochems. (2002). External representation of argumentation in CSCL and the management of cognitive load. *Learning and Instruction*, 12, 121-138.

Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge: Harvard University Press.

Wagner, E. (1994). In support of a functional definition of interaction. *The American Journal of Distance Education*, 8(2), 6-29.

Wagschal, P. (1998). Distance education comes to the academy: But are we asking the right questions? *The Internet and Higher Education*. 1(2), 125-130.

Wilson, B. (1997). Reflections on constructivism and instructional design. Retrieved on 10/29/02 at http://carbon.cudenver.edu/~bwilson/construct.html

Winn, W. (2002, September). Current trends in educational technology research: The study of learning environments. *Educational Psychology Review*, 14(3), 331-351.

Wong, D., Packard, B., Girod, M, & Pugh, K. (2000). The opposite of control: a Deweyan perspective on intrinsic motivation in “After 3” technology programs. *Computers in Human Behavior*, 16, 313-338.

Yair, G. (2000, October). Not just about time: Instructional practices and productive time in school. *Education Administration Quarterly*. 36(4), 485-513.

Zafeiriou, G., Nunes, J., & Ford, N. (2001). Using students’ perceptions of participation in collaborative learning activities in the design of online learning environments. *Education for Information*, 19, 83-106.

Vita

Ondrea Michelle Quiros was born on November 22, 1971 in Beaufort, South Carolina. She is the daughter of Carol Wolf, a realtor, and Peter L. Wolf, an attorney, both of whom still reside in her hometown of Hilton Head Island, South Carolina. Ondrea attended the Florida State University, and graduated Magna Cum Laude with a Bachelor of Science degree in Communication in 1992, and a Master of Arts degree in English Literature in 1994. She then joined the Peace Corps in 1995, where she taught Literature in several universities in Morocco until 1997. She began teaching at the Cochise College of Douglas, Arizona in 1998. It was here that Ondrea became interested in the possibilities of online higher education, and began teaching online. When her family moved to Ft. Hood, Texas, Ondrea began her doctoral studies in the Department of Instructional Technology at the University of Texas in January of 2000 to learn more about online education.

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